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## Free Paper Oral Presentations

### 76: Horses for courses: targeted or universal MRSA screening in high endemic situations?

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Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

Mater Dei Hospital is the main tertiary hospital in Malta, a country with historically high MRSA prevalence. Between 2008 and 2013, when the hospital adopted risk based admission screening, MRSA incidence (MRSA-I) only reduced from 1.1 to 1.0 per 1000 bed-days (/1000BD). In early 2014, the hospital switched to universal admission screening, utilising chromogenic agar and undertaken centrally by the hospital's IPC department, through a bespoke protocol, achieving >95% compliance. This was followed by a consistent reduction in MRSA-I, reaching <0.4/1000BD by end 2017.

Implementing a transfer function model approach for time series, we found no relationship with alcohol hand-rub or total antibiotic utilisation. Other than a marginal association with consumption of antibiotics effective against MRSA, the increase in screening was the predominant predictor of the MRSA-I decline, which still did not level out by end 2017. Transfer function models including the screening intervention yielded reasonably good fit ( $R^2=0.556$ ). Similar results were obtained using monthly MRSA proportions ( $R^2=0.508$ ) as the dependent variable. No significant trends or non-stationary behaviour was detected, pre-intervention, in both cases. Screening intervention had no impact on MSSA incidence, where consumption of quinolones and cephalosporins was the only significant predictor. The programme, costing <€75,000 per year, resulted in almost 200 less clinical cases annually by 2017 (compared to previous trends) with estimated yearly savings >€250,000.

Targeted MRSA screening was not the answer in our hyper-endemic situation, due to overwhelming colonisation levels and underlying system issues. Universal screening offered both logistical and cost-effective advantages to attain better control.

## 111: Effects of piperacillin-tazobactam exposure on intestinal colonisation with *Klebsiella pneumoniae* OXA-48 in an in-vitro gut model

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Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

Carbapenamase producing *Enterobacteriaceae* (CPE) are increasingly problematic nationally and globally. CPE can colonise the colon within the 'normal microbiota', thus presenting problems regarding patient management and infection control. Antibiotic exposure may affect intestinal colonisation, but this phenomenon is poorly understood. We have used a reflective in-vitro colonic microbiota model to investigate the effects of piperacillin-tazobactam exposure on *Klebsiella pneumoniae* OXA-48 (KP48) populations.

Three models were seeded with faeces from healthy volunteers, and stable microbiota populations established. Piperacillin-tazobactam (358mg/L, 3x daily, 7 days) and increasing inocula of KP48 (range 3.3-6.3 log<sub>10</sub> cfu) were instilled as follows: Model 1 - piperacillin-tazobactam before KP48 inoculation; Model 2 - piperacillin-tazobactam concomitant with KP48 inoculation; Model 3 - no antibiotic exposure. Lactose fermenting *Enterobacteriaceae* (LFE) and KP48 populations were enumerated daily on MacConkey agar and Colorex mSuperCARBA, respectively. Selected microbiota populations were enumerated every 2-3 days.

In the absence of antibiotic selective pressure (Model 3), KP48 was detected only sporadically and did not establish. However, when inoculated into a disrupted microbiota (Models 1 and 2), KP48 populations increased markedly to ~8 log<sub>10</sub> cfu/mL to become the dominant LFE. This increase was delayed in Model 2. As the microbiota recovered from antibiotic exposure, KP48 populations decreased, and the diversity of LFE increased; however, KP48 populations remained >6 log<sub>10</sub> cfu/mL.

Piperacillin-tazobactam exposure markedly affected KP48 populations within a mixed bacterial environment, leading to rapid proliferation and colonisation; these effects were not observed in the absence of antibiotic exposure. Such observations may have important implications for prescribing practice.

## 215: Multisite Bacillus outbreak related to laundry management

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Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

Nottingham University Hospitals is a 1700 bed acute trust, serving 2.5 million local residents with specialist services for 6 million people.

In August 2016, two Intensive care patients were reported to have Bacillus cereus line related bacteraemia. These were the first bacillus blood culture positives in ICU.

Case finding identified 34 blood culture isolates of Bacillus species, from July to September 2016 (baseline incidence 0-2 Bacillus isolates per month).

Bacillus is an environmental contaminant, but infections have been reported in vulnerable patient groups: neonates, immunosuppressed patients and those with indwelling medical devices.

Potential cases were reassessed for clinical significance (n=38, July-October). Seven isolates were deemed to have caused actual Infection; six may have caused infection and the remainder were of doubtful significance.

Contaminated laundry was suspected, particularly in view of staffing issues, equipment failures and a backlog of soiled linen bags stored in full sun (April, May and June). Sampling of freshly laundered sheets commenced mid-September using direct impression onto 90mm CLED plates, incubated at 37°C for 48 hours (method and action limits: Peter Hoffman, PHE).

Semi-confluent growth of Bacillus species was detected on a range of laundered items (action limit: 3-5 colonies per plate). All colonies were consistent with bacillus species.

A range of control measures were deployed.

The number of Bacillus isolates fell to four in October 2016, with a return to background rates from November.

Optimising control measures remains a challenge, but two years on, bacillus counts are stable at <1 colony forming units per plate.

## 46: Are we missing oral MRSA? A comparison of two screening methods.

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Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

Trafficking of staphylococci between the nose and the oral cavity is well documented. Patients that are nasal methicillin resistant *Staphylococcus aureus* (MRSA) carriers may also harbour it in the throat/oral cavity. However nasal and oro-pharyngeal co-carriage is infrequently quantified. Screening practices vary with the throat/oral cavity seldom tested. To determine the incidence of concurrent MRSA carriage of the nose, throat/oral cavity a prospective study was undertaken.

Ethical permission was obtained and patients with nasal MRSA carriage were recruited subject to written consent. From each participant a throat swab was taken, and then requested to rinse their mouth for one minute with sterile phosphate buffered saline (PBS). Throat swabs were cultured directly on MRSASelect™ II. One ml aliquots of PBS specimen were pelleted by centrifugation, resuspended in 200 µl PBS and plated on MRSASelect™ II. Plates were incubated at 37°C for 24 h. Suspect MRSA colonies were confirmed as *S. aureus* using the Pastorex® Staph-Plus test.

Of the 20 nasal carriers investigated, 80% (n=16/20) harboured MRSA in the throat/oral cavity. The sensitivity of swab sampling was 65% (13/20) vs 80% (16/20) using PBS. Comparing throat swab to oral rinse, the difference in MRSA detection was not statistically significant (p=0.48), however a kappa value of 0.51 demonstrates moderate agreement. Oral rinse samples containing as low as five CFU/ml of MRSA (range 5-300CFUs/ml) were detected with this method.

For MRSA oral screening PBS offers a superior alternative to throat swab-sampling. Enhanced decolonisation methods that consider oro-pharyngeal carriage should be investigated for MRSA decolonisation.

## 69: Transmission of *Clostridium difficile* spores within an American healthcare facility

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Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

*C. difficile* is the primary cause of antibiotic associated diarrhea globally. In unfavorable environments the organism produces highly resistant spores which can survive microbicidal insult. Our previous research determined the ability of *C. difficile* spores to adhere to clinical surfaces finding that spores had marked differences hydrophobic properties and adherence ability. Investigation into the effects of the microbicide Sodium dichloroisocyanurate on *C. difficile* spore transmission revealed that sub lethal concentrations increased spore adherence without reducing viability; hence increasing spore transmission ability. This research examines the ability of spores to transmit across key surfaces within an American healthcare facility. We aim to understand whether these surfaces contribute to nosocomial spore transmission and infection rates.

Surgical gowns, hospital floor vinyl and stainless steel were loaded with  $1 \times 10^6$  spores/ml of *C. difficile* spore preparations (PCR ribotypes 027 and 002). The hydrophobicity was examined using a plate transfer assay and transmission electron microscopy. The experiment was repeated with loaded clinical surfaces exposed to 1000 ppm sodium dichloroisocyanurate for 10 minutes contact time. Survival of spores on each surface was examined after neutralization of microbicide activity. Results revealed that the hydrophobicity and structure of clinical surfaces may influence spore transmission and that outer spore surface structures, such as exosporial-like projections, may play a part in spore adhesion. Spores were able to survive surfaces after microbicidal exposure at the recommended concentration of 1000 ppm. This study demonstrates that *C. difficile* spores are able to transmit between varying clinical surfaces despite appropriate use of microbicides.

## 120: Blue light (400nm) – a novel decontamination strategy for carbapenemase-producing *Enterobacteriaceae*?

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Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

### Background:

Carbapenemase-producing *Enterobacteriaceae* (CPE) pose a considerable threat to modern medicine. New treatment options and methods to limit spread need to be investigated.

Blue light (BL) is intrinsically antimicrobial, and we have previously demonstrated significant antimicrobial effects on biofilms of a panel of isolates, including two CPEs.

### Aim:

This study was performed to assess the antibacterial activity of 400nm BL against a panel of CPE isolates (four encoding blaNDM, four blaKPC, two OXA-48, and two encoding both NDM and OXA-48 carbapenemases).

### Methods:

*In vitro* experiments were conducted on 72 hour old biofilms of CPEs which were exposed to 60 mW/cm<sup>2</sup> of BL. Changes to biofilm seeding were assessed by measuring the optical density of treated and untreated biofilms.

### Findings:

Twelve bacterial clinical isolates (comprising eight *Klebsiella pneumoniae*, one *K. oxytoca*, and three *Escherichia coli*) were tested. BL was delivered for 5, 15 and 30 minutes, achieving doses of 162, 54, and 108 J/cm<sup>2</sup>, respectively.

All of the CPEs were susceptible to BL treatment, with increasing reductions in seeding with increasing durations of exposure. At 30 minutes, reductions in biofilm seeding of ≥80% were observed for 11 of the 12 isolates, compared to five of 12 after 15 minutes. CPE\_8180 was less susceptible than the rest, with a maximum reduction in seeding of 66% at 30 minutes.

### Conclusion:

BL is effective at reducing the seeding of mature CPE biofilms *in vitro*, and offers great promise as a topical decontamination/treatment agent for both clinical and environmental applications.

## 59: Biofilm and the genesis of cancer on implantable medical devices

**Vickery K<sup>1</sup>**, Deva A<sup>1</sup>, Hu H<sup>1</sup>, Mempin M<sup>1</sup>

<sup>1</sup>*Macquarie University*

Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

The use of implantable medical devices continues to rise and so does the number of complications. Breast implant associated anaplastic large T cell lymphoma is only found in women with textured breast implants. We found textured implants support more bacteria than smooth implants and that a linear relationship between biofilm load and lymphocyte activation exists in vivo. There are significantly more Gram-negative bacteria incorporated into the lymphoma than non-cancerous implant capsules, suggesting that cancer development is stimulated by chronic Gram-negative antigen stimulation, resulting in sustained T-cell proliferation. We measured tumour and control cell proliferation in response to plant (phytohemagglutinin - PHA), Gram-negative bacterial mitogen (lipopolysaccharide LPS) and Gram-positive bacterial antigen Staphylococcal enterotoxin A (SEA).

### Methods

Breast lymphoma cells (primary patient, n = 9 and TLBR cell lines, n= 3); primary cutaneous tumor cells (pc-ALCL, n=2); immortal MT-4 cells; and peripheral blood mononuclear cells from patients with capsular contracture (CC, n=3) and 3 healthy controls were stimulated with antigens at 10µg/ml, for 72 hours. Mitogen-induced proliferation was measured using a tetrazolium (MTT) assay.

### Results

Patient lymphoma and TLBR cells responded significantly more to LPS than PHA ( $p < 0.05$ ). In contrast, pc-ALCL, MT-4, CC and control cells had higher stimulation index values with the T-cell mitogen PHA ( $p < 0.05$ ). The SEA and PHA responses were similar in all cells, except control patients, who had lower SEA responses.

### Conclusion

These findings support to our hypothesis that a predominantly Gram-negative microbiome is the inflammatory trigger that leads to T-cell activation and sustained clonal proliferation.

## **64: Reducing catheter associated urinary tract infections in hospitals: a multi-site randomised controlled study**

**Mitchell B**<sup>1</sup>, Cheng A<sup>2</sup>, Fasugba O<sup>1,3</sup>, Gardner A<sup>4</sup>, Koerner J<sup>7</sup>, Collignon P<sup>5</sup>, Graves N<sup>6</sup>, Gregory V<sup>1</sup>

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Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

**Introduction:** Meatal cleaning prior to urinary catheterisation typically involves either saline or chlorhexidine. This variation is arguably a result of the uncertainty in evidence. This study evaluates the effectiveness and cost-effectiveness of using chlorhexidine in meatal cleaning prior to catheter insertion, in reducing catheter-associated asymptomatic bacteriuria (CA-ASB) and CAUTI.

**Methods** A 32 week, stepped-wedge randomised controlled clinical trial was conducted at three Australian hospitals. The intervention was the use of chlorhexidine (0.1%) solution for meatal cleaning prior to catheter insertion, the control was normal saline (0.9%). A Poisson regression model was used to estimate the impact of the intervention. No delay in the effect of intervention on the outcome was expected. An incremental cost-effectiveness ratio was used to assess cost relative to health benefits.

**Results:** 1642 catheters were inserted over the study period. The use of chlorhexidine was associated with a 94% reduction in the incidence of CAUTI (0.45 to 0.17 per 100 catheter days) and CA-ASB (1.03 to 0.71 per 100 catheter days). In Poisson regression, a reduction in CAUTI of 94% (IRR 0.28, 95%CI 0.08-0.93) and a 72% reduction in CA-ASB (IRR 0.06, 95%CI 0.01-0.32) was identified. Reductions were seen at all three hospitals. Changes in costs and the cost-effectiveness of the intervention are being analysed and will be presented.

**Conclusion:** The routine use of chlorhexidine was associated with a large decrease in bacteriuria and CAUTI at all sites. Findings have implications for clinical practice and for guideline developers internationally.

Australian and New Zealand Clinical Trial Registry, 12617000373370.

## 135: Outcome of hospitalised patients with catheter-associated complicated urinary tract infection. Results of the COMBACTE-MAGNET, RESCUING study

**Gomila A**<sup>1,8</sup>, Carratalà J<sup>1,8,9</sup>, Eliakim-Raz N<sup>2</sup>, Shaw E<sup>1,8</sup>, Wiegand I<sup>3</sup>, Vallejo-Torres L<sup>4</sup>, Vigo J<sup>5</sup>, Morris S<sup>4</sup>, Stoddart M<sup>6</sup>, Grier S<sup>6</sup>, Vank C<sup>3</sup>, Cuperus N<sup>7</sup>, Van den Heuvel L<sup>7</sup>, Vuong C<sup>3</sup>, MacGowan A<sup>6</sup>, Leibovici L<sup>2</sup>, Addy I<sup>3</sup>, Pujol M<sup>1,8</sup>

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Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

**Background:** Catheter-associated complicated urinary tract infections (CA-cUTI) are an important cause of morbidity and increased healthcare costs. We aimed to analyse the outcome of patients with CA-cUTI.

**Methods:** This was a multinational, multicentre, retrospective study at 20 hospitals in 8 countries from Europe, Turkey and Israel including hospitalised patients with cUTI between January 2013 and December 2014.

**Results:** Out of 1007 episodes of cUTI, 341 (33.9%) were CA-cUTI. Time between catheter insertion and the diagnosis of cUTI was <2 weeks in 44.6% cases. Seventy-four percent of cases were healthcare-related or hospital-acquired. Patient characteristics associated with CA-cUTI were male gender, age ≥65 years, diabetes mellitus, admission for a non-cUTI reason, being admitted from a long-term care facility, Charlson's score ≥4, organ transplant recipients, immunosuppression, functional dependence, acquisition of cUTI in a medical care facility, neurogenic bladder and severe sepsis or septic shock. Patients with CA-cUTI presented more multidrug-resistant gram-negative bacteria, prolonged length of stay, less symptoms' improvement post-7 days of treatment and higher mortality than patients with other sources of cUTI. Nevertheless, CA-cUTI was not an independent risk factor for 30-day mortality. These were age ≥65 years, having a haematological malignancy, admission for a non-cUTI reason, functional dependence, acquisition of cUTI in a medical care facility and the presence of severe sepsis or septic shock.

**Conclusions:** A third of patients had CA-cUTI, being the most frequent source of cUTI. Patients with CA-cUTI showed a higher mortality than others, related to a more serious baseline status than to the CA-cUTI.

## **115: Assessment of screening methods used for the detection of the carbapenamase producing *Enterobacteriaceae* (CPE) *Klebsiella pneumoniae* OXA-48**

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Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

Carbapenamase producing *Enterobacteriaceae* (CPE) pose an increasing healthcare burden. Currently, there is no 'gold-standard' for CPE detection. We aimed to evaluate selected CPE detection assays in an in-vitro system.

Using a clinically reflective colonic model, increasing concentrations of *Klebsiella pneumoniae* OXA-48 (KP48) (range 3.3-6.3 log<sub>10</sub> cfu) were introduced into three distinct microbiota models: Model 1- antibiotic-induced dysbiosis before inoculation; Model 2 - antibiotic-induced dysbiosis concomitant with inoculation; Model 3 - intact microbiota. Models were screened (triplicate) for KP48 using three agars (Brilliance CRE, Colorex mSuperCARBA, CHROMID CARBA SMART), and a molecular test (Cepheid Xpert Carba-R assay).

In Model 1, KP48 was detected following the lowest inoculum (3.3 log<sub>10</sub> cfu). CARBA SMART detected KP48 in 2/3 replicates only; all other methods were positive 3/3 replicates. In Model 2, KP48 was detected following inoculation of 3.7 log<sub>10</sub> cfu (3/3 replicates Cepheid and Brilliance; 1/3 replicates Colorex and CARBA SMART). All methods were positive in all replicates after inoculation with 3.5 and 3.9 log<sub>10</sub> cfu in Models 1 and 2 respectively. In Model 3, KP48 was only detected by Cepheid (3/3 replicates), but not by agars, after the highest inoculum (6.3 log<sub>10</sub> cfu).

Detecting CPE in mixed bacterial populations is problematic, and affected by antibiotic exposure. Relatively high inocula were undetectable in an intact microbiota, whereas antibiotic exposure greatly increased the likelihood of detection. The Cepheid assay was the most reproducible and sensitive method in this study. Further work will help elucidate the relevance of these results to clinical CPE screening practice.

## **57: Improving hand hygiene compliance among anaesthetic staff using the WHO concept “patient’s contaminated zone”**

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Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

### Background:

Doctors’ and nurses’ compliance with hand hygiene in the operating room is monitored monthly by direct observations according to a national model similar to the observation model described by the WHO (1) at Uppsala University Hospital in Sweden. Compliance is low among anesthesia staff at the hospital as observed elsewhere (2,3).

### Aim:

To increase compliance with hand hygiene among anesthesiologists and nurse anesthetists during routine anesthesia.

### Method:

The WHO model for hand hygiene (1) was adapted to fit routine procedures during anesthesia in the orthopedic operating ward at the hospital. The contaminated patient zone was defined and visualized to aid staff to understand when to perform hand hygiene. The working area was divided into a contaminated zone and a clean zone, staff were educated, training material including an online film and posters created.

### Results:

During a period of 7 months (Sept 2017-April 2018) compliance with hand hygiene increased from 25 % to 70 % among anesthesia staff in the orthopedic operating theatre.

### Discussion:

Several complex processes are overlapping and performed simultaneously during routine anesthesia making opportunities for hand hygiene difficult to define. Gloves are often overused instead of hand rub (2).

Standardization of work processes can increase compliance with hand hygiene as demonstrated by Scheithauer et al. (4). The WHO model for hand hygiene with the visualization of the contaminated patient’s zone is an excellent tool for anesthesia staff to understand when to perform hand hygiene during routine anesthesia.

## 53: Epidemiology and interventions in 23 carbapenem-resistant organism outbreaks involving hospital wastewater drains

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Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

Background: Evolving genomic epidemiology tools combined with new insights into the ecology of wastewater drain (WWD) biofilm have provided new perspectives on the clinical relevance and pathogen transmission risks of these fixtures.

Methods: All published reports of outbreaks attributed to WWDs which: a.) Investigated the outbreak epidemiology of WWD associated transmission of pathogens; b.) Utilized advanced microbiologic methods to establish clonality of outbreak pathogens and/or resistance genes; c.) Described interventions implemented to mitigate transmission of the outbreak pathogens from WWDs; were collated, compared and analyzed.

Results: All WWD associated outbreaks occurred in acute care hospitals and involved carbapenem-resistant organisms (CROs). Of the outbreaks, 16 (69%) were from Europe. Most of the outbreaks (87%) related to a single CRO. Four outbreaks involved between 2 and 6 species of CROs that shared the same resistance gene or genes and (35%) were associated with metallo- $\beta$ -lactamase producing CROs. There was a very wide range in the duration of outbreaks (1-91 months), with 61% being of 2 or more years duration. Once an outbreak was identified, all sites implemented a wide range of liquid drain disinfection protocols and enhanced infection prevention activities, typically with little success. Likewise, sink drain replacement had limited impact, where studied. Several studies described extensive in-vivo resistance gene transfer between drain biofilm associated pathogens.

Conclusions: While developing effective interventions to prevent transmission of WWD pathogens to patients is of immediate importance, it will be equally critical to concomitantly evaluate and mitigate WWD biofilm colonizing plasmid mediated anti-microbial resistance.

## 146: Evaluation of droplet production by a new design of clinical hand wash basin for the healthcare environment

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Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

### Background

Water splashing from sinks during hand washing may be a source of airborne and surface bacteria in the healthcare environment. A novel splash-reducing basin was assessed for its ability to reduce droplet formation during simulated hand-washing cycles. The design incorporated a fin and hydrophilic glaze designed to deflect water and reduce splashing. The basin was compared to two conventional basins commonly used in healthcare.

### Methods

Basins were mounted in a test system and enclosed in a 2x2m space. A tap mounted above each basin was flushed for 30 seconds with water containing a fluorescent dye to visualise droplets. Droplets that landed on the floor were categorised into sizes (<1mm, 1-5mm and >5mm diameters) and quantified by pattern recognition software.

### Results

Small droplets of <1mm in diameter were the most predominant with all basins (73-86% of droplets). With conventional basins, >1000 droplets were formed during 30 second flushing cycles and were found to spread more than 2m from the front of the basins. The novel basin significantly reduced the number of droplets formed (mean of 263 droplets, n=3) and reduced the distance spread.

### Conclusion

With high levels of bacteria such as *Pseudomonas aeruginosa* or *Legionella pneumophila* in water, small droplets may contain sufficient quantities of bacteria to contaminate surrounding surfaces or cause infection in patients. Use of a splash-reducing basin may reduce the risk of contamination in the environment.

## **148: Use of a model hospital sink system to investigate proliferation, aerosolisation and dispersal of carbapenemase-producing *Enterobacteriaceae* from hospital waste traps.**

**Aranega Bou P<sup>1</sup>**, Paton S<sup>1</sup>, Moore G<sup>1</sup>, Bennett A<sup>1</sup>

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Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

Carbapenemase-producing *Enterobacteriaceae* (CPE) are increasingly important causes of healthcare-associated infection. Reservoirs include hospital sinks, waste traps and drains. A unique laboratory model incorporating stainless-steel utility sinks (SSUS) and clinical hand-wash basins (CHWB) has been built to simulate a clinical setting.

Eight hospital waste traps contaminated with CPE-containing biofilms and four uncontaminated (non-hospital) traps were installed. Taps were automatically operated for 30 seconds four times a day and dosed with nutrients daily. No cleaning or disinfection was applied. Changes in microbial communities were determined using selective media and MALDI-TOF MS. The potential for aerosols and droplets to be released was assessed using cyclone air samplers and settle plates.

Upon installation of the waste traps, regular addition of nutrients was required to maintain *Enterobacteriaceae* levels in the waste trap water. Population changes over time were observed including bacterial exchange between sinks connected via a common waste pipe, attributed to back-flush events. Aerobiological sampling highlighted dispersal risks. Dispersal was greater in sinks fitted with hospital traps contaminated with CPE-containing biofilms compared to when non-hospital traps were artificially seeded. The accumulation of water in the sink basin due to bad drainage led to a significant increase in CPE recovery. Both SSUS and CHWB can release *Enterobacteriaceae* into the clinical environment (up to 64 cm for CHWB and 1 m for SSUS), but dispersal risk is greater from SSUS.

Our results suggest that CPE present in hospital sinks could re-enter the clinical environment. The presence of biofilm and bad drainage are major risk factors.

## **173: Limiting the spread from an environmental reservoir of blaVIM-positive *Pseudomonas aeruginosa* in a large tertiary care hospital: a before-and-after analysis of an intervention with sink plugs**

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Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

blaVIM-positive *Pseudomonas aeruginosa* has been detected in patients since 2003 at low endemicity in Erasmus MC, Netherlands. Environmental culturing in the hospital revealed that sink drains were the main reservoirs for these resistant bacteria. From there, bacteria can spread to other surfaces in the environment. Several interventions in and around the sinks failed to fully eradicate the bacteria. In 2013, sink plugs without holes that covered a large part of the drain were installed in two intensive care units (ICUs) and four other wards to limit spread of this bacterium. The objective of this study was to assess the efficacy of this intervention. Samples were taken from sink drains, washbasins, faucets and counters multiple times before and after the intervention. Those were screened for blaVIM-positive *P. aeruginosa* using qPCR on enrichment broth. Two ICUs had a significantly reduced number of positive samples after sink plug installation (ICU-2: 49% before vs. 20% after, P-value <0.001; ICU-3: 55% before vs. 30% after, P-value 0.001). ICU single-bed rooms, medication rooms and dirty utility rooms were identified as “hotspots” for VIM-positive *P. aeruginosa*. These rooms had a significantly reduced number of positive samples after the intervention. Out of four sample sites within each sink area, sampled both before and after the intervention, washbasins (8.3% before vs. 2.1% after, P-value <0.001) and drains (30% before vs. 8.3% after, P-value <0.001) had significantly reduced numbers of positive samples. In conclusion, sink plugs are an effective strategy to reduce environmental spread of *P. aeruginosa* from drain reservoirs.

## **181: Outbreak of GES-5 carbapenemase producing *Pseudomonas aeruginosa* associated with a haematology unit**

**Matthews T<sup>1</sup>**, Gray H<sup>1</sup>, Fletcher C<sup>1</sup>, Gunning Z<sup>1</sup>, James R<sup>1</sup>, Kidd S<sup>1</sup>, Hutchinson N<sup>1</sup>, Cortes N<sup>1</sup>, Hill R<sup>2</sup>, Thomas C<sup>1</sup>

<sup>1</sup>Hampshire Hospitals NHS Foundation Trust, <sup>2</sup>PHE Colindale

Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

Haematology ward inpatients have varying degrees of immunosuppression making them susceptible to opportunistic infections. Isolating multidrug resistant organisms can cause complications in their management so extra vigilance is required.

In 2013 two patients on a Haematology ward had MDR *Pseudomonas aeruginosa* isolated from blood culture. An investigation prompted weekly screening of all admissions for MDR *Pseudomonas* spp.. Screening did not detect any clinical isolates until late 2017 when a further two patients had MDR *Pseudomonas aeruginosa* isolated from blood culture. VNTR typing demonstrated good similarity between these isolates and those from 2013. The carbapenemase was sequenced and found to be an identical GES 5 carbapenemase.

This led to an extensive investigation of the environment, with the hypothesis that the drains were likely to be the original source. Environmental sampling revealed several *Pseudomonas* spp., varying in sensitivity pattern including a VIM carbapenemase producing *P. aeruginosa*. An epidemiological investigation linked all of the cases to one single side room, mitigating actions were taken to ensure that all sinks, taps and toilets were compliant the Department of Health (England) Health Building Note standards (HBN 00-09 and HBN 00-10 part C). Based on other studies domestic staff were trained to clean sinks and drains with a three cloth cleaning technique method.

We continue to screen admissions to the ward, have raised awareness of this outbreak and reviewed the antibiotic policy for sepsis for patients on the ward.

This represents an unusual outbreak as isolates were found to be separated in time by four years.

## 51: Healthcare staff should avoid using the first sample of water dispensed from hospital taps

**Hutchins C<sup>1</sup>**, Moore G<sup>2</sup>

<sup>1</sup>Quadram Institute, <sup>2</sup>Public Health England

Free Papers 3 (Tue 27 Nov 08:00 - 09:00), Hall 1C

Background: Contamination of hospital tap water can occur through retrograde-contamination or due to colonisation of plumbing components.

Aim: To investigate whether flushing taps can reduce levels of water contamination.

Method: To simulate retrograde contamination, tap outlet fittings were wiped using *Pseudomonas aeruginosa*-contaminated cleaning cloths and installed within an experimental water distribution system.

Taps were flushed for 30-seconds, five times over a 20-minute period and water was collected and cultured. The impact of different outlet fittings on the efficacy of flushing was also assessed.

To simulate systemic contamination, solenoid valves associated with each experimental tap assembly was contaminated with *P. aeruginosa*. Water contamination was monitored over 12-weeks. The taps were flushed for 30-seconds, five times over 20-minutes. The first, second and third sample of water collected during each 30-second flush was cultured.

Results: Regardless of OF design, *P. aeruginosa* levels in water dispensed from cloth-contaminated taps decreased with increasing tap usage (i.e. over a series of flushes). However, whilst simplified OF designs were 'cleared' of retrograde contamination, conventional OFs continued to dispense water contaminated at  $\geq 10\text{CFU}/100\text{mL}$ .

Biofilm colonisation of solenoid valves led to persistent water contamination over a 12-week period. *P. aeruginosa* levels in water dispensed from affected taps decreased over the course of one 30-second flush ( $\leq 2.1\text{-log}(10)$  reduction). However, reduction was superficial and returned to baseline levels within five minutes of stagnation.

Conclusion: Whilst retrograde-contamination can be reduced by flushing, staff should be trained to discard/avoid the first sample of water dispensed from taps regardless of stagnation period.

## **116: Preventing *Escherichia coli* bacteraemia through optimised hospital hydration – An in-patient survey on drinks consumption on care of the elderly wards**

Omar F<sup>1</sup>, Khan A<sup>1</sup>, Wilson P<sup>2</sup>, Montaneiro K<sup>2</sup>, Taylor I<sup>2</sup>, **Wiley E**<sup>2</sup>

<sup>1</sup>St George's, University of London, <sup>2</sup>University College London Hospital

Free Papers 2 (Tue 27 Nov 08:00-09:00), Hall 1B

### Background:

Dehydration may be associated with urinary tract infection and the development of *E. coli* bacteraemia. The elderly are vulnerable to dehydration due to age related changes in physiology, physical and cognitive impairment and are at greatest risk of developing *E. coli* bacteraemia. Dehydration may persist during hospital admission. An English prospective, cohort study identified 62% of dehydrated elderly patients at admission remained dehydrated 48 hours later and were 6 times more likely to die in hospital

### Methods:

A written patient survey was conducted at University College London Hospital on two elderly care wards (n=27) with verbal prompts as required to quantify in-patient drinks consumption, understand barriers to drinking and gauge hydration health literacy. Survey design and the pilot were informed by a multi-disciplinary team including infection specialists, dietitians, nurses and patient experience team. Patients on fluid restriction were excluded.

### Results:

70% (19/27) patients rated hydration as 'very important' for health, yet only 11% (3/27) met minimum recommended fluid intake of 1600ml/day (8 cups). 26% drank 1-3 cups, 59% 4-7, 4% 8-10 and 7% 11-13 (4% u/c). Tea, coffee and fruit juice were the main drinks offered. Barriers included inability to reach for drinks, difficulty handling polystyrene cups and lack of thirst.

### Conclusions

Elderly patients remain inadequately hydrated during their in-patient stay, with potentially preventable increased risk of sepsis. Resource allocation for the procurement of sturdy cups, increased prompting and assistance to drink and provision of a variety of beverages is recommended as part of an infection prevention strategy.

## **11: Nosocomial transmission of hepatitis C virus in Hong Kong: implication of reusable blood collection tube holder as the vehicle for transmission**

**Wong S<sup>1</sup>**, Cheng V<sup>1</sup>, Yuen K<sup>2</sup>

<sup>1</sup>Infection Control Team, Queen Mary Hospital, <sup>2</sup>Department of Microbiology, The University of Hong Kong

Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

**Background:** A liver transplant recipient developed hospital-acquired symptomatic hepatitis C virus (HCV) genotype 6a infection 14 months post-transplant.

**Methods:** Standard outbreak investigation by patient chart review, interviews of patients and staff, observational study of patient care practices, environmental surveillance, blood collection simulation experiments, and phylogenetic study of HCV strains from suspected source patient, environment and index patient were performed.

**Results:** A reusable blood-collection-tube-holder with barely visible blood stains was found to be the only shared item posing risk of transmission from the suspected source with high HCV load to the index patient. Fourteen times of sequential blood collection from source and then index patient on the same day was noted on the computerized time log of the laboratory barcoding system during their 13 days of hospitalization, while only five times of blood collection was noted from index and then source patient. Disinfection of tube-holders was not performed after use between patients. HCV genotype 6a was found in the blood contaminated tube-holder. Phylogenetic analysis of 653 bp in the hypervariable E1-E2 region showed only 1 to 3 bp differences between source, holder and index suggesting clonality. Blood collection simulation experiments showed that HCV and Technetium isotope contaminating the tip of sleeve capping sleeved-needle can reflux back from vacuum-specimen-tube side to patient's side.

**Conclusion:** Reusable blood-collection-tube-holder without disinfection between patients can cause nosocomial HCV infection. Single-use disposable device should be used not just to prevent needlestick injury, but also minimize the risk of patient-to-patient transmission of blood-borne viruses.

## 29: Outbreak of invasive group A *Streptococcus* : investigations using agar settle plates detect perineal shedding from a healthcare worker

**Mahida N**<sup>1</sup>, Prescott K<sup>1</sup>, Yates C<sup>2</sup>, Spencer F<sup>2</sup>, Weston V<sup>1</sup>, Boswell T<sup>1</sup>

<sup>1</sup>Department of Clinical Microbiology Nottingham University Hospitals, <sup>2</sup>Infection Prevention and Control Department, Nottingham University Hospitals

Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

### Background

Outbreaks of group A *Streptococcus* (GAS) infections can occur in healthcare settings.

### Aim

To describe the investigation and control of an outbreak of healthcare-associated GAS on a medical ward.

### Methods

Four patients developed septicaemia due to GAS infection without a clinically obvious site of infection. The outbreak team undertook an investigation involving a retrospective review of GAS cases, prospective case finding, HCW screening and environmental sampling using both swabs and settle plates. Immediate control measures included source isolation and additional cleaning of the ward environment.

### Findings

Prospective patient screening identified one additional patient with throat GAS carriage. Settle plate positivity for GAS was strongly associated with the presence of one individual HCW on the ward, who was subsequently found to have GAS perineal carriage. Contamination of a fabric-upholstered chair in an office adjacent to the ward, used by the HCW, was also detected. In total, three asymptomatic HCWs had throat GAS carriage and one HCW had both perineal and throat carriage. All isolates were typed as emm 28.

### Conclusion

This is the first outbreak report demonstrating the use of settle plates in a GAS outbreak investigation on a medical ward, to identify the likely source of the outbreak. Based on this report we recommend that both throat and perineal sites should be sampled if HCW screening is undertaken during an outbreak of GAS. Fabric, soft furnishings should be excluded from clinical areas as well as any adjacent offices because pathogenic bacteria such as GAS may contaminate this environment.

## **113: Lessons learned from an outbreak of Carbapenem Producing *Klebsiella pneumoniae* in a district general intensive care unit: system wide collaboration to screen contacts following discharge to the community can work.**

**Vasant J**<sup>1</sup>, Beech E<sup>2</sup>, Pritchard Y<sup>1</sup>

<sup>1</sup>Royal United Hospital NHS Foundation Trust, <sup>2</sup>NHS Bath and North East Somerset CCG

Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

### Introduction

Public Health England (PHE) provide guidance for the management of carbapenemase-producing *Enterobacteriaceae* (CPE) contacts following outbreaks, however national experience of effective community screening following discharge is lacking. We report our experience implementing community screening in 11 patients discharged from hospital following an outbreak, and analyse its efficacy and practicality.

### Outbreak Response

During November 2017 an outbreak of OXA-48 *Klebsiella pneumoniae* occurred within a district general hospital intensive care unit. The outbreak response included screening of case-contacts. We completed this process post-discharge through collaboration between the Acute Trust, PHE, 3 Clinical Commissioning Groups (CCGs), 3 Community Trusts, and multiple General Practices. Patients were screened by a variety of clinicians including practice and community nurses, and at planned hospital appointments. Collaborative working ensured 91% of discharged contacts completed screening and were also advised to inform healthcare staff providing care within the next 12 months of their CPE contact. No further contacts have screened positive to date.

### Discussion

The decision to complete screening for all contacts was considered necessary for the patients' future care and the local health economy IPC. Challenges included lack of awareness of CPE, its management and risks in the community, lack of PPE and skills to enable rectal screening, and timeliness of communication to community clinicians following discharge. Enablers included a well-established system-wide HCAI collaborative network and a collective desire to ensure this outbreak strain did not become endemic. We identified opportunities to improve local and PHE guidelines to ensure effective system-wide management of future CPE outbreaks.

## **138: Challenges of norovirus outbreaks on an austere military operation- the same but different.**

**Biswas J<sup>1,2</sup>**, Hill N<sup>2</sup>, Nordmann G<sup>3</sup>, Horne S<sup>4</sup>, Vincent E<sup>5</sup>, Mackenzie H<sup>1</sup>, Green A<sup>5</sup>, Ross D<sup>5</sup>, Hutley E<sup>1</sup>

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Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

Norovirus outbreaks severely impair the effectiveness of a hospital, both in the UK and in austere environments on military operations. We describe the challenges of a norovirus outbreak on a recent military hospital deployment, and solutions found to manage it.

In spring 2017 a military deployment to South Sudan commenced with construction of the camp and hospital a priority. During this time, there was a daily rate of 1-3 cases of bacterial diarrhoea, likely from contaminated soil and water supply.

However, one month after arrival, 9 diarrhoea cases presented in a single day, including vomiting, suggesting an outbreak. This affected around 35 of 130 personnel at risk and was declared over 13 days later.

The principles of management of an outbreak on austere operations are similar to the UK, but with stark differences in practice.

Outbreak management committees include military engineers and other components, and potentially other nations. There is early involvement of an Environmental Health team alongside deployed Infection Control. Isolation facilities are erected and separate ablutions constructed to meet the requirements for cohorting; public areas such as gym are cordoned off. Local water is superchlorinated and facilities reviewed. Case management is confined due to limited facilities but with on-site access to laboratory and molecular detection capability. Specialist advice is received and higher commands in UK informed despite the remoteness of location.

Outbreaks present a significant challenge in resource-limited settings- but with solid principles of management, control can be achieved in the desert as it can in the suburbs.

## **177: An Outbreak of MRSA colonisation in a neonatal intensive care unit: use of a case control study to control it and lessons learned.**

Brown N<sup>1,2</sup>, Reacher M<sup>1</sup>, Rice W<sup>1</sup>, Roddick I<sup>1</sup>, Reeve L<sup>1</sup>, Verlander N<sup>3</sup>, Broster S<sup>2</sup>, Ogilvy-Stuart A<sup>2</sup>, D'Amore A<sup>2</sup>, Ahluwalia J<sup>2</sup>, Robinson S<sup>2</sup>, Thaxter R<sup>2</sup>, Moody C<sup>2</sup>, Kearns A<sup>3</sup>, **Enoch D**<sup>1,2</sup>

<sup>1</sup>Public Health England, <sup>2</sup>Addenbrookes Hospital, <sup>3</sup>Public Health England

Free Papers 1 (Tue 27 Nov 08:00 - 09:00), Main Auditorium

**Background:** We describe an outbreak and case control study involving MRSA that occurred on our neonatal intensive care unit (NICU) in 2016 and the lessons learnt.

**Methods:** All infants colonised or infected with gentamicin resistant MRSA were included as cases. An incident management team (IMT) meeting was convened after three infants were colonised. Barrier precautions and hand hygiene audits were performed. Topical decolonisation was considered inappropriate due to the delicate nature of premature infants' skin. Infant screening was increased to twice weekly. Enhanced cleaning of the unit was implemented. Acquisitions continued leading to MRSA screening for all NICU staff. Three controls were selected for each case using random numbers.

**Findings:** Eight infants were colonised with MRSA (spa type t2068). One of these infants later developed an MRSA bacteraemia. MRSA colonisation was significantly associated with gestational age ( $p=0.001$ ); lower birthweight ( $p<0.001$ ) and with being a twin ( $p=0.02$ ). Multivariable logistic regression identified being looked after by nurse 45 as a risk factor. Only nurse 45 was colonised with spa type t2068.

**Interpretation:** Lack of accurate recording of which nurses looked after which infants (and when) made identification of the risk posed by being cared for by particular nurses difficult. If this had been clearer, it may have enabled earlier identification of the colonised HCW and avoided subsequent cases. We highlight the benefit of using a case-control study which showed that an association with colonized infants had not been established for most nurses.

## **152: Forced air warming does not adversely influence air quality or contamination of the surgical field in operating theatres with unidirectional downward airflow**

**Lingaas E<sup>1</sup>**, Hompland A<sup>1</sup>, Hochlin K<sup>1</sup>, Karlsen J<sup>1</sup>, Terjesen A<sup>1</sup>, Elsebutangen N, Byholt A<sup>1</sup>, Ødeskaug L  
<sup>1</sup>*Oslo University Hospital*

Free Papers 4 (Wed 28 Nov 08:00 - 09:00), Main Auditorium

**Background:** Forced air warming (FAW) is extensively used in operating theatres to prevent hypothermia. Several authors have argued that FAW may increase the risk of airborne contamination, especially in theatres with unidirectional downward airflow. However, most studies on this issue have been done with surrogate markers, and not with bacteria. Good clinical studies are lacking.

**Methods:** We measured airborne bacterial counts (CFU) and sedimentation of bacteria to the surgical field with and without FAW during 12 simulated operations in an operating theatre with unidirectional downward airflow. All personnel used surgical mask, cap and cotton scrub suit. Four of six personnel used sterile gown and gloves. All procedures were standardized. Three pairs of procedures were done with upper body and lower body warming blankets respectively, and each pair was done on the same day, in alternating order. The “washout period” between procedures was 60 – 75 minutes.

Air samples (1 m<sup>3</sup>) were collected at 5 minute intervals at 4 different locations close to the surgical field and instrument tables. Sedimentation plates were placed on the surgical field and instrument tables, covering a total area of 672 cm<sup>2</sup> and 896 cm<sup>2</sup> respectively for 1 hour. Air and surface samples were incubated at 37 °C for 5 days. Results were expressed as CFU/ m<sup>3</sup> and CFU/ dm<sup>2</sup> respectively

**Results:** We did not detect differences in bacterial contamination of the air or sterile surfaces between surgical procedures performed with and without forced air warming in an operation room with unidirectional downward airflow.

## Free Paper Poster Presentations

### 12: A multidisciplinary approach to antimicrobial stewardship

**Rahman S<sup>1</sup>**, Niazi-Ali S<sup>1</sup>, Sacho H<sup>1</sup>

<sup>1</sup>*Tameside and Glossop Integrated Care Organisation Foundation Trust*

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The Antimicrobial Management Team is responsible for antimicrobial stewardship and the dissemination of best practice with regards to the management and treatment of infections. However, engaging other healthcare professionals who will encounter antibiotics at different stages of prescribing, supply and administration can strengthen the campaign to ensure appropriate antimicrobial use.

We use a multidisciplinary approach to ensure carbapenems are not overused through inappropriate prescribing. Tameside and Glossop Integrated Care NHS Foundation Trust serves a population of about 250,000 and covers an area of approximately 135km<sup>2</sup> across Tameside and the Glossopdale area of High Peak. The spectrum of patients requiring healthcare varies enormously.

Antibiotics are not restricted in the Trust, but we work very hard to protect ALL antibiotics. The guidelines only include carbapenems for ONE indication (neutropenic sepsis). However, the Team are alerted to the use of carbapenems at each stage of its journey. Once prescribed, the ward pharmacists inform the team and we can assess the appropriateness of the prescription. Infection Prevention Nurses look out carbapenem use on their surveillance visits. Pharmacy Technicians inform the team when wards order carbapenems for patients or stock that has not been approved by the microbiologist. Doctors will question on-call recommendations for the use of carbapenems.

Because of the efforts demonstrated here, we can proudly say we have never encountered a "home-grown" case of CRE and continue with the excellent work and education that is provided on a daily basis to all, ensuring antimicrobial stewardship strategies become embedded into everyday practice.

## **45: Assessing prescribing practices to monitor antimicrobial stewardship (AMS) following a period of increased incidence of *Clostridium difficile***

**Pipe M**<sup>1</sup>, Hussain A<sup>2</sup>, Bhogal R<sup>2</sup>

<sup>1</sup>University of Birmingham, <sup>2</sup>University Hospitals Birmingham

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Antimicrobial Stewardship (AMS) compliance is a mandatory indicator in the management of *Clostridium difficile* infection (CDI) rates in the United Kingdom. The rate of CDI was 26.0 cases per 100,000 population in 2015/16 and every NHS trust has a compulsory target for CDI set by the local Clinical Commissioning Group (CCG). *Clostridium difficile* (*C. difficile*) is a gram positive spore-forming bacterium manifesting clinically as diarrhoea and pseudomembranous colitis, and is associated with significant mortality and morbidity. A period of increased incidence (PII) is defined as two or more patients within a clinical area diagnosed with CDI within 28 days, and in these cases all inpatient antimicrobial prescribing is audited. CDI cases at the Heart of England Foundation Trust (HEFT) were investigated using a snapshot audit tool to assess antimicrobial prescribing practices across five wards with a recent PII.

Five wards with a PII were audited to monitor: use of 'Stop Dates', antimicrobial indication, appropriate use of microbiology samples and compliance with the HEFT guidelines. These criteria calculate a rating for each ward, defined as Red (90%), Amber (70-90%) or Green (>90%).

One ward scored green, one scored amber and three scored red. Four wards at HEFT were therefore below the accepted AMS standard. This will lead to ongoing AMS scrutiny, with potential for accountability and retraining, as well as improvements in clinical quality and safety.

## **74: Effectiveness of a nurse/pharmacist ward-focussed antimicrobial stewardship team**

**Ashton K<sup>1</sup>**, Barker D<sup>1</sup>, Bond S<sup>1</sup>

<sup>1</sup>*Mid Yorkshire Hospitals NHS Trust*

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

Nurses are underutilised in AMS, and nurse/pharmacist-led initiatives have not been well described in the literature. A pilot on the acute admissions unit (AAU) demonstrated the value of nurse/pharmacist collaboration for post prescription review and individual feedback. A low intervention rate for intravenous to oral switch (IVOS) due to the timing of intervention in relation to patient admission, led to a change of location to acute care of the elderly (ACE).

### Method

An antimicrobial pharmacist and a senior infection control nurse, both non-medical prescribers, attended ACE for two hours each week from October to December 2017. Patients admitted for 48 hours or more were screened for antibiotic use. Interventions were documented in the medical notes and fed back to the medical team. Interventions were defined as dose or duration optimisation, escalation, intravenous to oral switch (IVOS), de-escalation, and cessation.

### Results

On ACE 39 patients on antibiotics were reviewed on 6 ward rounds. Empiric antibiotic choice was appropriate in 28/39 patients. The intervention rate was 59% (23/39), compared with 30% (21/69) on AAU. The most common intervention was de-escalation (9/23), followed by IVOS (4/23), cessation (4/23) and escalation (4/23).

### Discussion

Improved intervention rates on the ACE unit suggest that transferring the ward round was beneficial and that AMS initiatives were more necessary in this area. A shortage of consultant microbiologists required the AMS team to consider this creative multi-disciplinary approach to ward rounds and the benefit has been clearly demonstrated.

## 88: Use of an antimicrobial stewardship app facilitates timely prescriber feedback and saves time

**Almushcab N<sup>1</sup>**, Gaughan L<sup>2</sup>, Nash D<sup>2</sup>, Ryan D<sup>2</sup>, Fitzpatrick F<sup>1,2</sup>  
<sup>1</sup>Royal College Of Surgeons Ireland, <sup>2</sup>Beaumont Hospital

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** Audit is an essential component of antimicrobial stewardship (AS). An AS auditing app (MEGAudit) was used to improve AS on one ward. The app generated a report for immediate prescriber feedback and exported inputted data into excel for further analysis.

**Methods:** A prospective, biweekly four week AS audit was performed on a respiratory ward. Data was inputted directly into the app, prescriptions discussed with the clinical team and audit results presented weekly. Antimicrobial resistance (AMR) data on ward respiratory specimens over a six- month period was retrospectively analysed. Time to collect audit data was compared with paper documentation.

**Results:**

Compliance with antimicrobial guidelines improved from 50% to 80% prescriptions. Of the 29/73 culture positive respiratory specimens, *Enterobacteriaceae* (n=9), *Pseudomonas aeruginosa* (n=7) and *S. aureus* (n=5) predominated. Weekly discussions highlighted lack of relevant AMR data, issues with acquiring respiratory specimens and gaps in antimicrobial guidelines for this patient population. The app was quicker (5.0 minutes/patient) compared to paper documentation (9.0 minutes). There was no additional data entry step for further analysis as the app automatically downloaded audit data to an excel sheet.

**Discussion:**

The app performed well as an audit tool, specifically its function of immediate prescriber feedback. Weekly discussions helped explore issues behind prescriber antimicrobial choice and discuss potential solutions. This study has identified the need for improved/prospective AMR data in these patients to guide appropriate prescribing and highlighted the requirement for hospital antimicrobial guidelines to cover this specific group of patients.

## **91: Antifungal stewardship in critical care: Implementing a diagnostics-driven care pathway for the management of invasive candidiasis**

**Hare D**<sup>1</sup>, Cottrell E<sup>2</sup>, Connolly E<sup>3</sup>, O' Connoll B<sup>1</sup>, Rogers T<sup>1,4</sup>, Coates C<sup>1</sup>, Talento A<sup>1,4</sup>

<sup>1</sup>Department of Clinical Microbiology, St James' Hospital, <sup>2</sup>Department of Pharmacy, St James' Hospital, <sup>3</sup>Department of Anaesthesia and Intensive Care, St James' Hospital, <sup>4</sup>Department of Clinical Microbiology, Trinity College

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** Invasive candidiasis (IC) is the most common invasive fungal disease in patients admitted to critical care (CrCU). Early diagnosis remains challenging due to the low sensitivity of culture-based techniques and the lack of internationally agreed case definitions. Previous published reports have shown the potential usefulness of fungal biomarkers such as 1-3 beta-d-glucan (BDG) in the early diagnosis and management of IC in CrCU.

**Aim:** To determine the impact of a diagnostics-driven approach in the management of IC in critical care in St. James' Hospital.

**Methods:** A care pathway which incorporates serum BDG determination in the management of patients in CrCU with suspected IC was rolled out. Compliance to the pathway was prospectively audited. Patient demographics, laboratory results including BDG and culture results, antifungal consumption and patients' outcome were collected.

**Results:** Since implementation, there have been 93 antifungal treatment episodes for 77 patients with suspected IC. Of these, 80/93 (86%) had at least one serum BDG sent, of which 46 (58%) were negative. 24/80 (30%) episodes were classified as probable and 6/80 (7.5%) proven IC. After review, antifungal therapy was discontinued in 25 of the BDG negative episodes (54%). None were diagnosed with IC within 7 days of stopping. Antifungal consumption data suggests a decrease in antifungal use since roll-out of the pathway.

**Conclusion:** Results suggest that access to on-site BDG assay can assist clinicians to adopt a diagnostics-driven approach in the management of IC in critical care. The care pathway lends support to antifungal stewardship without compromising patient safety.

## 109: Antimicrobial stewardship in a conflict zone

**Bowman C**<sup>1</sup>, Kanapathipillai R<sup>1</sup>, Malou N<sup>1</sup>, Michel J<sup>1</sup>

<sup>1</sup>MSF

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Antimicrobial resistance is one of the biggest threats to food security, global health and development today. The Middle East is a region which experiences high levels of antimicrobial resistance, and specific factors contributing to the problem in this area include destabilisation of health infrastructure secondary to conflict, lack of reliable microbiological testing facilities and uninformed use of antibiotics by both medical personnel and the public. As such, the non-government organisation Médecins Sans Frontières have made tackling antimicrobial resistance one of their prime activities. This presentation will describe the implementation of infection services in this context and through a number of settings, including a paediatric unit, a reconstructive surgery project, an acute trauma hospital and a rehabilitation centre, all servicing victims of conflict. We will elaborate on the challenges and opportunities in implementing antimicrobial stewardship programmes, infection prevention and control protocols and effective microbiological laboratories, as well as sharing local resistance data, including rates of MRSA, ESBL and CRE from two sites in Jordan and Yemen.

## **119: Understanding the barriers and facilitators to reviewing antimicrobials: a quality improvement project**

**Drake S<sup>1</sup>**

<sup>1</sup>*Leeds Teaching Hospitals NHS Trust*

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: PHE 'Start smart - then focus' guidelines (2015) recommend undertaking antimicrobial stewardship reviews 48-72 hours after prescribing an antimicrobial. Previous improvement work at Leeds Teaching Hospitals to introduce a sticker to aid reviews was largely unsuccessful. To guide future interventions a project was carried out to understand the barriers and facilitators to reviewing antimicrobials.

Methods: A questionnaire was developed based on the Theoretical Domains Framework of behaviour change and distributed to pharmacists, nursing and medical staff on two acute wards. The questionnaire assessed 11 different barriers that might prevent behaviour change.

Results: 43 questionnaires were completed. All doctors agreed that reviewing antimicrobials is important and most feel that it is their responsibility to do so. The majority of staff are clear about what their role should be in the process. The four main barriers identified were cognitive processes, memory and decision making; environmental context and resources; motivation and goals; and social influences.

Discussion: Multiple barriers exist to reviewing antimicrobials. Knowledge and skills were not identified as one of the main barriers suggesting that the introduction of further guidelines may not improve the frequency or outcome of antimicrobial reviews. Future work is focusing on communication between staff and improving the systems involved in the daily functioning of the wards, especially handover and identification of patients requiring review. If these interventions demonstrate an improvement these approaches will be extended to other wards in the hospital.

## 134: Development of a model to measure biofilms and EPS breakdown

Salisbury A<sup>1</sup>, Mullin M<sup>1</sup>, Chen R<sup>1</sup>, Percival S<sup>1</sup>

<sup>1</sup>5D Health Protection Group Ltd

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Biofilms are microbial cells that adhere to surfaces and each other and secrete extracellular polymeric substance (EPS), encasing themselves in a matrix. Biofilms can form on all abiotic and biotic surfaces, such as medical devices and wounds, causing infection, inflammation and delayed healing. They often exhibit increased tolerance to antimicrobials and are therefore difficult to treat. The EPS is thought to be a contributing factor to the increased tolerance of biofilms, therefore treatments to breakdown the EPS would be beneficial to increase the efficacy of antimicrobials against the biofilm. The aim of this study was to develop an *in vitro* model to determine biofilm EPS breakdown using various wound dressings. An overnight culture of *Pseudomonas aeruginosa* was set up by inoculating 10 mL Tryptone Soya broth (TSB) and incubating at 37°C and 125 rpm. The overnight culture was adjusted to  $1 \times 10^8$  CFU/mL and added to a 12-well microtitre plate. The plates were incubated at 37°C and shaken at 125 rpm for 24 hours. The following day, biofilms were washed with 10mM phosphate buffered saline (PBS) and fresh TSB was added, with or without treatment. Plates were incubated for a further 24 hours. To determine EPS breakdown, the biofilm was stained with 0.5% crystal violet to measure total biomass and Live/Dead<sup>®</sup> Baclight<sup>™</sup> (Invitrogen, UK) to measure total cells and total live cells. Samples were also serial diluted and plated onto Tryptone Soya agar (TSA) to determine CFU/mL. Preliminary results show this model can measure biofilm and also EPS breakdown.

## 136: Fluorescent artificial wound eschar for *in vitro* eschar breakdown study

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Eschar, which serves as a reservoir for microorganisms, biofilms, devitalized tissue and inflammatory chemokines, is an important factor that impedes wound healing by forming a hostile local milieu, inhibiting skin cell proliferation and migration. Therefore, to breakdown and solubilize eschar would greatly enhance the efficacy of antimicrobials against wound biofilms and help tissue repair and regeneration. A new cost-effective system which includes the lab-made fluorescent artificial wound eschar (fAWE) and 6-well cell culture inserts was designed as an *in vitro* model to measure the breakdown ability of chemicals and reagents on artificial wound eschar (AWE). fAWE is composed of 65% FITC-collagen, 10% Rhodamine-elastin, 10% DCCA-fibrin, and 15% fresh fibrin, synthesized by clotting fibrinogen with thrombin. fAWE was placed into cell culture insert and test reagents placed on top. Then the cell culture insert was placed into a 6-well plate with 10 ml Tri-buffer. The plate was shaken under incubation and sampled at set time points from 0 hour to 48 hours. Using three different fluorescent dyes to tag collagen, elastin and fibrin, the decomposition of each protein in fAWE substrate was measured by determining fluorescence in each well. Various wound gels were used to demonstrate the validity of the system. Investigations incorporating biofilms into this model are being investigated. The results of the preliminary study implied that the fAWE system can be used to assess the breakdown and solubilization of AWE by test reagents through measuring the decomposition of collagen, elastin and fibrin which are main components of wound eschar.

## 145: Support for promoting the proper use of antibiotics to a community-hospital

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Introduction: In Japan, the number of infectious disease specialists (IDSs) is as extremely low as 1,400 and many hospitals do not have full-time IDSs. Therefore, our university hospital dispatches an IDS several times a month to a community-hospital and started a support to promote antimicrobial stewardship in 2015 by conducting meetings with ICT(infection control team)

Method:

Contents of the meetings (For example, discussion about the treatment to blood culture positive cases and cases with long-term antibiotics use)

Evaluation items

- ① two or more sets collection rate of blood culture
- ② De-escalation rate in *E. coli* UTI bacteremia
- ③ Percentage of confirmed negative blood culture in *S. aureus* bacteremia
- ④ Susceptibility of *P. aeruginosa* to various antibiotics

【Results】 The data for 2014 and 2017 are shown.

- ① : 75%→84%
- ② : 48% → 73%
- ③ : 0% → 63%
- ④ : CAZ 86% → 91%, MEPM 87% → 94%, GM 76% → 83%, CPMX 76% → 86%

Conclusion: Even with a small intervention by an IDS, it was possible to promote proper use of antimicrobial agents against major infectious diseases and suppress the emergence of resistant bacteria by conducting sufficient discussions with ICT. Meanwhile, leadership of a doctor belonging to ICT was also considered to be an important factor in order to negotiate with each clinical department smoothly and to build a motivated ICT.

## **174: Primary care antibiotic prescribing practice for children under the age of five years and mothers' attitudes to managing their child's illness**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Aim:** To explore primary care antibiotic prescribing practice for children under the age of five years and mothers' attitudes to managing their child's illness.

**Background:** Overuse of antibiotics and inappropriate prescribing has resulted in rapid development of antimicrobial resistance. Antibiotics are prescribed in around one in five general practitioner consultations with about twenty-five per cent prescribed to children between one and 14 years of age. Most childhood illnesses are caused by viruses rather than bacteria, often spontaneously resolving.

**Methods:** General practitioner antibiotic prescribing data was reviewed and focus groups held with mothers within a defined geographical area.

**Results:** Most consultations took place on Fridays during winter. Children under one years of age received the least number of antibiotic prescriptions than other age groups. Mothers felt anxious and less confident if their child was unwell, especially first time mothers. Nearly half of children received antibiotics from general practitioners, with chest infections cited as the most common reason.

**Discussion:** General practitioner prescribing data in children is minimal. There are often gaps in prescribing rationales and patient details, which would provide a more complete picture. Mothers of very young children were just as likely to visit their general practitioner as other mothers but less likely to receive antibiotics which suggests the visit maybe in response to anxiety and concern rather than illness . However prescribing data was limited and further study would be beneficial.

**Conclusion:** Mothers benefit from support, reassurance and information from healthcare professionals to inform their decision making for their children.

## 186: The impact of Friuli Venezia Giulia Antimicrobial Stewardship Program: analysis of fluoroquinolones consumption and resistance rates

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Friuli Venezia Giulia (FVG) Antimicrobial Stewardship Program (ASP) is the first regional ASP program in Italy; started in 2014, it involves 19 hospitals and 5 Local Healthcare Trusts. Production of regional guidelines and training for professionals are the main ASP activities adopted. One of the main goals of ASP is the decrease of consumption of fluoroquinolones (FQs) and the reduction of the spread of FQs resistant pathogens.

Data of antibiotic consumption are provided by FVG Pharmaceutical Service as DDD (defined daily dose). Trend of consumption in the period 2014-2017 is estimated. Data of bacterial FQs susceptibility (from 2015 to 2017) are provided by FVG Registry of Antimicrobial Resistance.

Between 2013 and 2017 a gradual decrease in levofloxacin use for hospitals (from 14.1 to 8.4 DDD per 100 bed-days) and territory (from 1.38 to 0.99 DDD per 1000 inhabitant-days) and in ciprofloxacin use for hospitals (from 4.8 to 4.3 DDD per 100 bed-days) and territory (from 0.66 to 0.56 DDD per 1000 inhabitant-days) is reported.

A significant decrease between 2015 and 2017 is observed in *P. aeruginosa* ciprofloxacin-R (from 24.2% to 20.9%,  $p<0.05$ ), in *Proteus* spp. ciprofloxacin-R (from 44.8% to 41.9%,  $p<0.05$ ) and in *S. aureus* levofloxacin-R (from 32.8% to 30.2%,  $p<0.05$ ).

The decrease in FQs use and the reduction in susceptibility of target pathogens prove FVG ASP positive impact. As a regional approach in the fight against antimicrobial resistance is proving to be efficient, it needs to be further strengthened and carried forward in the next years.

## 195: Correlation of anti-fungal use and increasing resistance: Retrospective analysis from an Oncology Center in Eastern India

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Strengthening of antifungal stewardship (AFS) requires data for development of anti-fungal drug resistance with their increasing use.

Aim: Study of correlation between anti-fungal use (daily defined doses- DDD) and isolation/ resistance profile of fungi in oncology patients.

Material/ methods: Retrospective analysis- 2015 to 2017

Results: A yearly total of 7601, 8158 and 8700 samples were processed for bacterial and fungus culture from 2581, 2859 and 3017 patients from 2015 to 2017. Proportion of fungus isolation was found to be 3.4%, 3.9% and 3.1% (samples), and 7.3%, 8.5% and 7.0% (patients). Majority of fungal isolates were *Candida* spp. Proportion of mould isolation was 1% (2/255), 2% (7/331) and 4% (12/271). Proportion of non-susceptible *Candida* isolates to Amphotericin B, Caspofungin, Fluconazole, Flucytosine, Micafungin, and Voriconazole was 7%, 1%, 12%, 8%, 0, 1% (2015), 20%, 0, 18%, 7%, 0, 3% (2016) and 6%, 1%, 20%, 14%, 0, 3% (2017).

Number of patients on any anti-fungal was 1278, 1048 and 1345 from 2015 to 2017 respectively. DDD (patient use) for Amphotericin B, Liposomal Amphotericin, Anidulafungin, Caspofungin, Fluconazole and Voriconazole was 154 (30), 227.3 (50), 66 (8), 726 (97), 479.5 (135), 53 (18) for 2015, 98 (23), 510.3 (86), 83 (10), 592 (93), 436.5 (128), 52 (18) for 2016, and 151 (30), 804.3 (109), 208 (30), 413 (74), 796.5 (209), 74 (24) for 2017.

Conclusions: This study highlights the increasing need of strengthening AFS. More streamline clinical algorithms are needed for use of preemptive and empirical anti-fungal use in specialized situations like immunocompromised patients.

## 218: Introduction of Tigecycline into our local guidance - summary of our experience.

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Tigecycline is a broad-spectrum antibiotic, first introduced in 2005, and is currently licensed for use in complicated intra-abdominal infections in the U.K. However, its use has been limited due to reports of increased all-cause mortality, though the reasons behind these findings are as yet unclear. Given a high baseline resistance to piperacillin/tazobactam across our local Gram-negative isolates and increasing rates of carbapenemase-resistant *Enterobacteriaceae* in our acute trusts, the decision was made to introduce Tigecycline in our antibiotic formulary for the empirical treatment of healthcare-associated intra-abdominal infections (HAI) and intra-abdominal collections (IAC). We then conducted a 6-week review of all Tigecycline prescriptions to assess whether Tigecycline was used as per recommendations, i.e. for appropriate indications, reviewed by infection specialists and prescribed with an adjunct in septic patients. We identified 84 relevant patients between February and March 2018, via electronic prescribing, with 3 patients having repeated prescriptions, thus 88 patient episodes. Excluding one patient for whom documentation was missing, Tigecycline was prescribed for HAIs and IACs in 68 cases (78% of 87 episodes). Other indications were varied but included known colonisation with multi-drug resistant organisms. However, all remaining patients had infection specialist review within 7 days. Adjuncts were prescribed in 62 (70% of 88 prescriptions) and appropriately prescribed for the 8 out of 10 patients identified as septic. Thus, our experience is that Tigecycline can be introduced into local formularies and, for the most part, appropriately used by clinicians, which is particularly important in this era of rising antibiotic resistance.

## 234: Impact of antibiotic stewardship ward rounds in surgery

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Surgery is an area of high antibiotic usage, both for pre-operative prophylaxis and post-operative complications, as well as skin, soft tissue and intra-abdominal infections. Broad-spectrum antibiotics such as Co-amoxiclav are often used first line, but inappropriate use carries risk. *Clostridium difficile* infection and bacterial resistance may occur if antibiotics are not chosen and targeted correctly.

An audit of anti-microbial prescribing on general surgical wards in 2015 at Queen Alexandra Hospital (Portsmouth) showed there was significant room for improvement - with 40% of antibiotic prescriptions found to be inappropriate. The audit also highlighted poor documentation regarding indication and duration of antibiotic courses.

In 2016 the Microbiology department initiated regular Antibiotic Stewardship ward rounds. This change saw a Consultant Microbiologist join surgical ward rounds on a weekly basis. We present the results of a pending re-audit of antibiotic prescribing on these wards, and the impact and lessons learned from the past 2 years of Antibiotic Stewardship ward rounds.

## 249: Gram-negative bacteraemia in a cohort of haematology/oncology patients in a tertiary centre

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

In England there is an aspiration to reduce healthcare-associated Gram-negative bacteraemia (HA-GNB) by 50% by 2021. A reduction of this magnitude can only be achieved in children if we are able to prevent HA-GNB in patients undergoing treatment for a haematological or oncological condition. One possible strategy would be to administer antibiotic prophylaxis during episodes of neutropenia.

### Background

Birmingham Children's Hospital is the largest tertiary haematology/oncology unit in the UK with approximately 250 new diagnoses every year. We reviewed all cases of HA-GNB in our patients between April 2017 and 2018.

### Data

There were 48 cases of HA-GNB during the time period across 39 patients with a median age of 8 years. Several clear patterns emerged from the data. The single biggest risk factor for HA-GNB was profound neutropenia with 69% of patients being neutropenic and 82% of those have a neutrophil count of zero. The highest group of affected patients were those with AML. Of the 11 patients who were diagnosed and treated for AML during the year, there were 8 episodes of HA-GNB occurring across 7 patients. Occurrence of HA-GNB was not associated with a particular stage of treatment.

### Conclusions

NICE Guidance recommended that in adults, fluoroquinolone prophylaxis should be offered during periods of chemotherapy-induced neutropenia. There is currently insufficient evidence that the benefits of universal prophylaxis in neutropenic children outweigh the risks. We suggest that an alternative approach in children may be targeted prophylaxis with ciprofloxacin in higher-risk groups such as those with AML.

## **258: Antimicrobial stewardship of surgical patients in a district general hospital: The role of the audit process in improving outcomes**

**Alhayek S<sup>1</sup>**, Al Shoek I<sup>2</sup>

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Antimicrobial stewardship has become an important topic in medical practice, leading to improved outcomes and decreased resistance.

We evaluated antimicrobial use within the department of general surgery at Wexham Park Hospital, Slough, a district general NHS hospital located in Southeast England. Usual practice at the hospital was for surgical emergency admissions to be started on therapeutic regimens before and after surgery, which involved intravenous Amoxicillin, Metronidazole, and Gentamicin for broad-spectrum coverage referred to as 'triple therapy' for intra-abdominal sepsis. Conversely, elective patients were given a dose of prophylactic antimicrobials peri-operatively and were only enhanced to triple therapy protocol with signs of intra-abdominal infection. Patients in both groups were then ideally switched to a narrow spectrum antimicrobial after cultures grew an organism and sensitivity analysis performed.

In this audit, we focused on proper antimicrobial use, dosages, durations, and timely review according to the hospital's guidelines. We reviewed one hundred fifty-five patients' prescription charts over a two-week period and found that over fifty percent of patients had an active prescription of antimicrobials at any one time. Of these patients, fifty-five percent had an avoidable error in prescribing. The most common errors included incorrect dosage and lack of prescription review. Through this period, we found that physicians prescribed with fewer errors (thirty-eight percent reduction) as the audit period progressed, revealing that the audit process itself acted as an intervention to improve clinical practice.

By instituting a continual antimicrobial stewardship program, we can improve patient outcomes while decreasing adverse effects including resistance.

## 261: Flomoxef may be an appropriate option for the empiric treatment of urinary tract infections

**Chang C<sup>1</sup>**

<sup>1</sup>*Department of Infectious Diseases, Tainan Municipal Hospital (Managed by Show Chwan Medical Care Corporation)*

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

The frequent pathogen leading to urinary tract infections (UTIs) is *Escherichia coli*; however, they have increased resistance to multiple antibiotics due to producing extended-spectrum beta-lactamase (ESBL).

### Purpose

The aim of this study was to investigate whether flomoxef, belonging to cephamycins with not being hydrolyzed by ESBL, was an appropriate option for the empiric treatment of UTIs.

### Materials and Methods

At a regional hospital in southern Taiwan, both the antibiotic susceptibility patterns and the incidence of ESBL of *E. coli* were reviewed from 2015 to 2017. Disk diffusion test was used for antibiotic susceptibility testing, and double disk test was used for detecting the presence of ESBL. The interpretation was according to Clinical and Laboratory Standards Institute recommendation.

### Results

Totally 11785 strains of *E. coli* were enrolled, including 2505 strains (21.3%) of ESBL *E. coli*. The incidences of ESBL *E. coli* were 21.3%, 23.5%, and 18.9%, in 2015, 2016, and 2017, respectively. The susceptibility rates of *E. coli* and ESBL *E. coli* to flomoxef were 83.4% and 75.5%, 86.9% and 85.3%, as well as 86.7% and 86.7%, in 2015, 2016, and 2017, respectively.

### Conclusions

The incidence of ESBL *E. coli* has been more than 20% at this hospital; hence, antibiotics, such as cefuroxime, ceftriaxone, and ceftazidime, hydrolyzed by ESBL are not appropriate options for the empiric treatment of UTIs. While flomoxef remains high susceptibility rate to *E. coli*, including ESBL *E. coli*, which may be an appropriate option for the empiric treatment of UTIs at this hospital.

## 262: Doripenem may be the preferred antipseudomonal carbapenem for clinical use

**Chang C<sup>1</sup>**

<sup>1</sup>*Department of Infectious Diseases, Tainan Municipal Hospital (Managed by Show Chwan Medical Care Corporation)*

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

The incidence of carbapenem-resistant organisms (CRO) have increased worldwide, leading to treatment difficulty due to limited treatment options.

### Purpose

This study was conducted to evaluate which antipseudomonal carbapenem was the preferred option for clinical use by analyzing each carbapenem susceptibility rates of CRO.

### Materials and Methods

At a regional hospital in southern Taiwan, from July 2015 to June 2018, CRO, including carbapenem-resistant *Escherichia coli* (CREC), carbapenem-resistant *Klebsiella pneumoniae* (CRKP), and carbapenem-resistant *Pseudomonas aeruginosa* (CRPA), were collected and analyzed their susceptibility rates to three carbapenems, including imipenem, meropenem and doripenem. Disk diffusion test was used for antimicrobial susceptibility testing. The interpretation was according to Clinical and Laboratory Standards Institute recommendation.

### Results

Totally 876 strains of CRO were enrolled, including 43 CREC, 310 CRKP, and 523 CRPA. The susceptibility rates of CREC to imipenem, meropenem, and doripenem were 2.3%, 74.4%, and 69.5%, respectively. Those of CRKP to imipenem, meropenem, and doripenem were 1.9%, 60.6%, and 47.1%, respectively. Those of CRPA to imipenem, meropenem, and doripenem were 9.6%, 16.4%, and 26.4%, respectively.

### Conclusions

Some previous reports have demonstrated that doripenem is less likely to select CRPA than other carbapenems. This study reveal doripenem has higher susceptibility rates to CRPA, echoing previous viewpoint. Of the CREC and CRKP, imipenem has the less susceptibility rates than imipenem and doripenem, while the susceptibility rates of doripenem and meropenem are similar. Hence, we propose that doripenem may be the preferred antipseudomonal carbapenem for clinical use to reduce selection of CRO.

## **264: Assessing the potential for reductions to inappropriate antibiotic prescribing for surgical prophylaxis in English secondary care, through analysis of the 2016 national point prevalence survey data**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

In 2016, the UK government set an ambitious target to reduce inappropriate prescribing by 50% by 2020. Within secondary care, antibiotic prescribing for surgical prophylaxis is a potential key target area for improvement although the extent of inappropriate prescribing is unknown. This work highlights inappropriate antimicrobial use (AMU) in surgical prophylaxis at a national level and provides estimates for the safe reduction of AMU.

### Methods

Data collected during the 2016 national point prevalence survey (PPS) in English secondary care were analysed. The proportion of inappropriate surgical prophylaxis AMU estimates were derived. Appropriateness was assessed based on national guidance, which recommends surgical prophylaxis be given as a single dose with repeated doses for prolonged surgery beyond the half-life of the antibiotic. Prophylaxis was considered inappropriate if administered as more than two doses or prescribed for more than one day.

### Results

The 2016 PPS captured data on a total of 1653 surgical prophylaxis prescriptions, from 75 NHS trusts (n=1112 patients) and 6 independent sector hospitals (n=541). There were differences observed in the proportion of inappropriate prescribing by hospital type ( $p<0.001$ ). 40% of prescriptions were administered as more than one dose, (31% >2 doses) and 21% were given for over one day. The proportion of inappropriate prescriptions varied by age (paediatrics = 65%, adults = 34%;  $p<0.001$ ).

### Conclusion

This work has identified that a considerable proportion of surgical antibiotic prophylaxis in English secondary care may be inappropriate. Surgical prophylaxis therefore represents a key target area for future quality improvement initiatives.

## **269: Preliminary blood culture rapid identification and resistance targets determination using GenMark Dx® ePlex Blood Culture Identification System improves sepsis management, aids early Antimicrobial Stewardship (AMS) interventions and results in significant cost savings**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### **INTRODUCTION:**

Time to appropriate antimicrobial therapy is essential to reduce mortality and morbidity in Sepsis related bloodstream infections (1).

### **AIM:**

To evaluate the laboratory, clinical, antimicrobial stewardship and health economic benefits of the Implementation of the GenMark Dx® ePlex Blood Culture Identification System.

### **METHOD:**

At the time of initial positivity blood cultures were processed using ePlex Blood Culture Identification System and standard laboratory methodology: gram stain, culture, Maldi-Tof identification (ID), EUCAST susceptibility testing (AST).

Additional clinical data was collected from electronic patient record and Telepath systems and collated in Microsoft Excel.

### **RESULTS:**

22 positive blood cultures were tested: two were mixed, nine were gram negative, one yeast and 10 were gram positive.

Average times to organism identification and resistance profiles N=22

ePlex System:

Time to identification and resistance profile: 2 hours (H):18 mins

Standard Methodology:

Time to ID: 30 H:15 mins.

Time to Resistance profile: 58 H: 48 mins

ePlex System concordance with final ID/AST result was 100% taking into account selection panels of resistance determinants.

The fungal identification was *Malassezia furfur*.

Potential AMS interventions of positive blood cultures using ePlex System include de-escalation in 18%, change to more appropriate antimicrobial in 18% and blood culture contaminants recognition in 14%.

### **CONCLUSION:**

GenMark Dx® ePlex Blood Culture Identification System allows rapid identification of clinically relevant bloodstream infection organisms and their resistance (e.g. CPE etc.), in addition out ruling blood culture contamination, resulting in early Antimicrobial Stewardship interventions and cost savings.

### **References:**

1. Pfaller et al. Clinical Microbiology Reviews. Jan 2007, p133-163.

# 1: Effect of formulation and implementation of local antibiotic protocol for treatment of pneumonia at medical wards / ICU, Indian study

**Radhakrishnan D<sup>1</sup>**, Guleria R<sup>1</sup>, Wig N<sup>1</sup>, Mohan A<sup>1</sup>, Kapil A<sup>1</sup>

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Introduction: Inappropriate usage of antimicrobials is the main cause of developing antibiotic resistance. Developing and implementing an antibiotic stewardship programs can reduce antimicrobial resistance worldwide.

The primary aim of this prospective study was to look at effect of formulation and implementation of a local antibiotic protocol at medical wards/ ICU for treatment of pneumonia [both community acquired (CAP) and hospital acquired (HAP)].

Present study was conducted in a tertiary care hospital of northern India over a period of 15 months, and patients, >18 years of age with diagnosis of pneumonia (both CAP and HAP) were included. All available culture and sensitivity reports for these patients were collected and a local antibiotic protocol was formulated incorporating microbiology data, sensitivity profile and patient characteristics.

The main outcome measures were changes in prescription pattern and sensitivity profile of microorganisms 3 months after the implementation of antibiotic protocol.

Results: A total of 112 patients in pre (9months) and 44 patients in post intervention phase (6months) were analyzed. *Acinetobacter* (61.76%, 63.04%), *Pseudomonas* (20.59%, 20.65%), *Klebsiella* (11.76%, 7.61%) and *E. coli* (1.47%, 6.52%), and *Klebsiella* were the main pathogens isolated in pre intervention phase (wards, ICU). Sensitivity profile of *Pseudomonas* (p=0.03) and *E. coli* (0.02) showed significant favorable change post implementation of antibiotic protocol. There was a favorable but non-significant increase of appropriate prescription [from 44.70% to 53.70% (p=0.26)] during post intervention phase.

Conclusion

Our study recommends the use of an appropriate local antibiotic policy to improve antimicrobial utilization and culture and sensitivity pattern of microorganisms.

## **28: Evaluation of elastomeric pump devices for the administration of continuous flucloxacillin in an inpatient setting**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction:

In this evaluation we aimed to explore patient and staff perceptions of elastomeric pump devices. These devices are a novel method of administering intravenous antibiotics via a continuous infusion and do not restrict patient freedom due to their small size and absence of any electronic components requiring a power source.

We also evaluated the potential financial implications of using the elastomeric devices in place of multiple daily infusions, as well as the potential time-saving implications for nursing staff involved.

### Methods:

Patients were recruited via a predetermined selection process and relevant nursing staff were trained in the safe use of the elastomeric devices. Use of the devices continued on an individual patient basis until one of the predetermined endpoints of therapy was met.

Qualitative and quantitative surveys of patients and staff involved in the evaluation were carried out. In addition, we performed cost and time analyses comparing the use of elastomeric devices and the traditional multiple daily infusions model.

### Results:

Staff and patient feedback regarding the elastomeric devices was extremely positive. We also found a significant time-saving opportunity by using elastomeric devices when compared to multiple daily infusions of the same antibacterial agent.

However, there was a significant cost implication in using the elastomeric devices which could potentially limit their use in everyday clinical practice.

### Conclusion:

The elastomeric devices are potentially a highly valuable tool best used under the supervision of an infection specialist. Currently, cost implications potentially limit their use to selected patient groups and specific antimicrobial agents.

## 32: Introduction of molecular/real-time PCR testing during a large scale CPE outbreak

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background:

In 2016 a CPE outbreak in Tallaght Hospital due to OXA-48 was declared. The requirement for extensive CPE screening and difficulties with OXA-48 detection had a significant impact on laboratory workload. Additionally, turnaround times of 72-96 hours delayed the timely implementation of infection control measures and impacted on patient placement.

### Methods:

Evaluation and implementation of a qPCR assay (LightMix) for CPE performed on a semi-automated PCR platform (Roche Flow Flex).

Faecal suspensions were performed to compare the assay limit of detection to that of CPE selective agar (CarbaSMART). For all patients with CPE detected from a screening swab, subsequent culture was performed.

### Results:

The LightMix modular CPE assay successfully detected representative isolates of the five CPE classes. Limit of detection analysis of the molecular assay confirmed a higher analytical sensitivity compared to even the most highly regarded selective culture media. there was a four-fold higher LoD sensitivity compared to culture for OXA-48 (102CFU/ml versus 106CFU/ml).

A one year analysis showed that 37% of CPE cases which were detected molecularly were not detected by established culture based screening methods at 24 hours.

### Conclusion:

As part of an outbreak management strategy, the reduced TAT (<24 hours) and increased detection sensitivity results in:

- o Earlier identification of CPE cases
- o Earlier implementation of IPC measures
- o Informed patient placement decision making
- o Reduced number of hospital acquired CPE cases

This allowed for reopening of wards, clinics and theatres to reduce the negative impact the outbreak has had on patient waiting list times.

## 42: Tackling carbapenem-resistant *Enterobacteriaceae* (CRE); In-Vitro efficacy of carbapenem-loaded calcium sulfate beads.

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<sup>1</sup>Biocomposites

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Aims

Carbapenem-resistant *Enterobacteriaceae* (CRE) infections are associated with poor outcomes; despite this, optimal treatments for CRE infections are largely unknown. It has been suggested that high levels of antibiotics locally may overcome resistance observed by some strains. Here, the efficacy of antibiotic-loaded synthetic recrystallised calcium sulfate beads (SRCSB) to inhibit bacterial growth against a series of CRE strains was investigated.

### Methods

Three strains of carbapenem resistant *K. pneumoniae* were assessed in a modified Kirby-Bauer assay. SRCSB\* were loaded with either meropenem, ertapenem, imipenem/cilastatin or colistin. Beads were placed onto individual agar plates seeded with each of the three *K. pneumoniae* strains, and incubated. Clear zones of inhibition (ZOI) were photographed, measured and average ZOI sizes recorded for each strain.

### Results

All antibiotic loaded beads produced clear ZOIs against each of the *K. pneumoniae* strains assessed. SRCSB loaded with meropenem produced the greatest zones against two of the *K. pneumoniae* strains. Imipenem/Cilastatin loaded beads were most effective against the remaining strain. Colistin beads produced zones of similar size against all *K. pneumoniae* strains.

### Conclusion

Local release of antimicrobials from calcium sulfate can result in sufficient concentrations to inhibit growth of multidrug resistant strains in-vitro. This study provides additional evidence that local release of antibiotics from SRCSB may be useful in the treatment of CRE type *K. pneumoniae*. High concentrations of antibiotics released locally were sufficient to prevent bacterial growth in-vitro. Differences in ZOIs observed between SRCSB loaded antibiotics, may be a result of variations in specific antibiotic mechanisms of action.

\*STIMULAN Biocomposites Ltd

## 43: Biofilm prevention and killing of Gram-positive bacterial pathogens involved in periprosthetic joint infection by antibiotic-loaded calcium sulfate beads (ALCSB) in-vitro.

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

A key stage in pathogenesis of periprosthetic joint Infection (PJI) is biofilm formation. A common approach in PJI management is the adjunctive use of local and systemic antibiotics. In this study, we evaluated the in-vitro efficacy of antibiotic-loaded calcium sulfate beads (ALCSB) to inhibit biofilm formation and kill pre-existing biofilms of Gram-positive pathogens involved in chronic PJI.

### Methods

Epidemic methicillin-resistant *Staphylococcus aureus* (EMRSA-16) and *S. epidermidis* were evaluated. ALCSB\* with vancomycin & gentamicin were placed on agar plates for 24h at 37°C. ALCSB were transferred daily onto fresh plates with fresh inoculum. Zones of inhibition (ZOI) were recorded until no inhibition was observed. To assess biofilm prevention, microorganisms were treated with ALCSB. Media was removed and challenged with fresh bacteria for 14 daily challenges. CFU counts were taken after 1,2,3,7 and 14-days. For killing of pre-existing biofilms, ALCSB were added to 3-day biofilms. CFU counts were recorded at 1,3 and 7-days.

### Results

ALCSB with Vancomycin & Gentamicin achieved a complete kill of EMRSA-16 after challenge 1 and 3 and by challenge 14, was comparable with control groups. *S. epidermidis* biofilm prevention assays showed ALCSB achieved a 6-log reduction in CFU/cm<sup>2</sup> after 2 challenges. For pre-existing biofilms, ALCSB with Vancomycin & Gentamicin achieved a complete kill of EMRSA-16 biofilms after 72h. ALCSB had no significant effect on pre-existing *S. epidermidis* biofilms at 24 hours (P=0.519) or 7 days (P=0.425) relative to unloaded beads.

### Conclusion

This study provides in-vitro evidence that ALCSB may be useful in the treatment of Gram-positive pathogens associated with PJIs.

## 61: ANTI-SUPERBUGS (ASB) Pre-Commercial Procurement (PCP)

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** Active surveillance systems in all European member states and Norway are one of the main contributors to the reduction of infections associated with multi-drug resistant organisms (MDROs). New technologies that combine current technological development with the needs identified by international health organizations must enter the MDRO war, creating the means to drastically reduce time of detection and antibiotic misuse in Healthcare-Associated Infections (HAIs).

**Methods:** The MDROs challenge, and the focus of this joint, 5,7 million European PCP project (co-funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No 688878), is to detect superbugs and/or other vectors of HAIs; to inform, in real-time, healthcare professionals of the presence, on hospital environments and fomites, of potentially multi-resistant microorganisms; and to share the information with the healthcare provider's electronic record systems whilst linking the detection with a geographical healthcare facility location.

**Results:** A methodology was defined to identify the needs of each country present in the ASB Consortium. Prioritization from the uncovered needs regarding MDROs identified *Clostridioides difficile*, *Klebsiella pneumoniae* and *Acinetobacter baumannii* as the MDROs most responsible for morbidity, mortality and healthcare costs and, therefore, as the MDROs the ASB PCP would target. Other needs, regarding technological demands, were also defined, concluding in the abovementioned requirements.

**Conclusions:** The ASB PCP and its challenge towards the industry to develop solutions that detect potential MDROs and give real-time feedback to the user come from the need for more accurate antibiotic use and a reduction in healthcare costs.

## 63: In vitro susceptibility of multidrug-resistant *Pseudomonas aeruginosa* isolates from Qatar to Ceftazidime/Avibactam and Ceftolozane/Tazobactam; $\beta$ -Lactam/ $\beta$ -lactamase combinations

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** The problem of multidrug-resistant *Pseudomonas aeruginosa* (MDR-PA) infections is a global healthcare challenge. Surveillance monitoring in Qatar established significant prevalence of MDR-PA. Collected isolates were tested against novel treatment options; Ceftazidime/avibactam (CZA) and Ceftolozane/tazobactam (C/T), which has been approved for treatment of complicated gram-negative infections.

**Methods:** A total of 205 MDR-PA isolates were collected between 2014-2015 from four hospitals in Qatar. The pathogens were isolated from: respiratory 44.9% (92), skin-soft tissues 26.3% (54), urine 23.4% (48), blood 3.4% (7) and other sites 2% (4). The activity spectrum of CZA and C/T were tested *in vitro* against MDR-PA using E-test according to standard recommendations.

**Results:** MDR-PA demonstrated favorable susceptibility to both CZA and C/T, at 68.8% (141/205) and 62.9% (129/205), respectively. Remarkably, 22.4% (46/205) of isolates were non-susceptible highlighting antimicrobial resistance endurance. Cumulative MIC distribution for CZA to both and C/T were MIC<sub>50/90</sub>, 4/64  $\mu$ g/ml and MIC<sub>50/90</sub>, 2/256  $\mu$ g/ml, respectively. When compared with eight other antibiotics, only colistin demonstrated higher susceptibility at 96.6%. The comparative results of phenotypically resistant of isolates to other antibiotics and CZA and C/T showed no significant correlation apart from fair agreement between C/T and CZA with amikacin (AMK) (0.37,  $p < 0.001$ ,  $k = 0.27$ ,  $p < 0.001$  respectively).

**Conclusion:** The study demonstrated promising high *in vitro* susceptibility of CZA and C/T against MDR-PA isolates in Qatar. The results paved the way for potential future role of CZA and C/T in the management of MDR-PA infections and will be recommended as alternatives to complement existing options hindered by their recognized limitations.

## **70: The resistance mechanisms of multidrug-resistant *Pseudomonas aeruginosa* isolates to *in vitro* ceftazidime/avibactam and ceftolozane/tazobactam, in Qatar**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** Multidrug-resistant *Pseudomonas aeruginosa* (MDR-PA) infections are a serious clinical challenge due to their resistance to most available antibiotics. Ceftazidime/avibactam (CZA) and ceftolozane/tazobactam (C/T) have recently approved and demonstrated good activity against Gram-negative bacteria. However, resistance to these new combinations has already been reported. We aimed to characterize the genetic mechanisms driving resistance to CZA and C/T in MDR-PA.

**Methodology:** From a total of 205 MDR-PA, 94 isolates were found to be resistant to one or both CZA and C/T antibiotics, of which 9 isolates (10%) were randomly selected for this study. Antimicrobial susceptibility was determined by Etest. The 9 isolates were subjected to whole genome sequencing.

**Results:** The 9 isolates belonged to 5 different sequence types; ST-292 (n=1), ST-233 (n=1), ST-308 (n=3), and ST-823 (n=1) ST-2613 (n=3). The isolates had between 2–4 different beta-lactamase genes from all classes. Four isolates had VEB-1a (Class A), 1 isolate had CARB-3, 4 isolates had VIM-2 (Class B), PDC-2, 3, 5, and 7 (Class C) were found in 3, 1, 1, and 4, respectively and OXA-4, 10, and 50 (class D) were found in 1, 2, and 9, respectively. The genes encoding the efflux pump; MexAB-OprM, MexCD-OprJ, MexPQ-OpmE and MuxABC-OpmB were found in all the isolates

**Conclusions:** The presence of 2 or more different beta-lactamase genes from all classes, including class B and D, which are known to be poorly inhibited by the beta-lactamase inhibitors, additionally to contained four efflux pump complexes could explain the resistance of those isolates to CZA and C/T.

## **71: Resistance and virulence profiles in *Staphylococcus sp.* *Pseudomonas sp.* and *Enterobacteriaceae* strains isolated from the hospital environment in Bucharest, Romania**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** Resistance and virulence determinants may reside within the same plasmids and can spread together raising the need for the implementation of screening and intervention measures for the prevention of severe infections with virulent, resistant strains occurred in hospitalized patients.

**Aim:** We investigated the phenotypic resistance and virulence markers in *Staphylococcus sp.*, *Pseudomonas sp.*, *Enterobacteriaceae* isolated from the hospital environment and patients with surgical wound infections in order to obtain epidemiologically relevant data.

**Methods:** The strains were tested for the production of cell-associated and soluble virulence factors. Multiplex PCR reactions were performed for the detection of the SCC mec cassette type in *S. aureus*, exotoxine genes in *Pseudomonas* and to identify the genetic support of cell-associated and soluble virulence factors in *Enterobacteriaceae* strains which in correlation with the LPS synthesis can cause lesions, inflammatory reactions that may even lead to septic shock

**Results:** 60% of the staphylococcus were MRSA and presented SCC mec cassette type III and IVa. *Pseudomonas* strains showed virulence genes. *Enterobacteriaceae* strains were resistant to beta-lactam antibiotics, penicillins and associations with beta-lactamase inhibitors, cephalosporins and carbapenems (encoded by blaTEM, blaNDMlike blaCTX-Mlike, blaOXA-48like genes), quinolones (QnrA, gyrB, parE), aminoglycosides (aac3Ia) and tetracyclines. Most of the strains presented at least one of tested virulence factors. The carbapenemases and ESBLs positive strains proved to be positive for the majority of the tested soluble virulence factors proving the pathogenic potential of strains.

**Conclusions:** Our results showed that the isolated strains harbour multiple drug resistance and virulence determinants, suggesting the possible nosocomial origin.

## 77: Analysis of the historical evolution of antimicrobial resistance in the main bacteraemia-causing organisms at MFT

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Bacteraemia may result in life-threatening sepsis requiring prompt antimicrobial treatment, which is complicated by increased resistance worldwide and the often time-consuming nature of microbiological diagnosis.

The objective of this study consisted of identifying local trends in antibiotic resistance to aid prescribing and infection control policy-making. Our rationale is that knowledge of the historical evolution of resistance for the key bacteraemia-causing species will greatly improve the outcomes of present-day patients.

We verified that the main species responsible for bacteraemia remained globally unaltered throughout the years analysed, with *Escherichia coli* being the main contributor (22.3-27.3% of total significant isolates between 2013-2017). The main source of *E. coli* bacteraemias was urinary tract infections (59% in 2017), whilst the role of enterococci in urosepsis appeared negligible. Resistance to antimicrobials was mainly found to be stable or exhibit a slight increase. However, the proportion of Gram-negatives identified as carbapenemase producers rose from 1.4-2.2%. For *E. coli*, combining gentamicin with other antibiotics is still beneficial in initial empirical treatment when compared to single antibiotics/other antibiotic combinations. Of particular note was an observed spike in co-amoxiclav resistance amongst Gram-negatives (24.3-39.3% from 2014-2017) largely due to changes in sensitivity testing based on EUCAST recommendations.

Our results support the continued inclusion of aminoglycosides in the initial empirical treatment of septic patients at our hospital. Performing periodic studies of the aetiology of bacteraemia as well as assessing antimicrobial resistance levels and the resistance mechanisms in blood culture isolates is crucial, especially in the context of any changes in laboratory practice.

## 78: Extra-hospital stay and direct costs caused by multidrug resistant healthcare-acquired infections

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Extra-hospital stay and direct costs by multidrug resistant (MDR) healthcare-acquired infections (HAI) in the Teaching Hospital "Sant'Andrea" in Rome.

Methods: In April-December 2015 all patients developing MDR-HAI were considered cases, all others were eligible as controls. A retrospective cohort study 1:1 matching was performed and controls were selected by stepwise fashion, using these criteria: Primary diagnosis (ICD) (5 points); length of stay in controls equal to interval from admission to infection in cases  $\pm 20\%$  (5 points); ward (5 points); surgery (4 points); age  $\pm 5$  years (4 points); sex (2 points).

Results: Overall 122 patients developed MDR-HAI and were all matched with controls (90.5% matching appropriateness). MDR-HAI attributable extra stay was 2,291 days (mean 18.8, median 19.0), respectively 35.0 days in ICUs, 21.2 in surgical wards and 14.1 in medical wards ( $p < 0.001$ ). A significant major extra stay was represented by bloodstream infections 52.5 days, followed by UTI 20.1, SSI 20.0, RTI 19.0 and *C. difficile* infections 7.5 ( $p < 0.01$ ). We found the highest extra stay for *P. aeruginosa* 34.0 days, followed by *K. pneumoniae* 32.6, *A. baumannii* 21.2, MRSA 18.0, and *C. difficile* 7.5 ( $p < 0.05$ ). Applying the single day hospital cost (€ 400 medical ward, € 600 surgery and € 1.000 in ICU) the overall MDR-HAI excess expenditure was €11,549 per patient (€33,833 in ICU, €12,740 in surgery and €5,649 in medicine). The average Alert-organism related antibiotic costs added €1,200 per case.

Conclusions: Extra-hospital stay and direct costs due to MDR-HAI were correctly estimated and resulted relevant.

## **81: Prevalence and antimicrobial susceptibility pattern of Methicillin resistant *Staphylococcus aureus* (MRSA) in Civil Hospital Lunglei, Mizoram: North Eastern part of India - Four years retrospective analysis**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** Methicillin resistant *Staphylococcus aureus* (MRSA) is now endemic in India. Understanding the prevalence, antibiotic resistant patterns and information on accurate and reliable detection methods of MRSA strains are necessary for appropriate antibiotic treatment and effective infection control. Considering these, the present study was performed to find the prevalence and evaluate the antimicrobial profile of MRSA strains isolated from different clinical samples in Civil Hospital Lunglei, Mizoram.

**Objectives:** The present study was carried out to investigate the prevalence of MRSA and their rate of resistance to different anti-Staphylococcal antibiotics in our hospital located in Lunglei, Mizoram.

**Methods:** Between May 2014 to April 2018, 758 clinical samples submitted at Microbiology Laboratory were processed and all *Staphylococcus aureus* isolates were included in this study. All isolates were identified morphologically and biochemically by standard recommended method and antibiotic susceptibility was determined by Kirby-Bauer disc diffusion method.

**Results:** A total of 117 *Staphylococcus aureus* were isolated from 758 clinical samples, among which 93 were MRSA. The average MRSA prevalence observed during this period was 79.48%. The overall MRSA prevalence was 12.26% among all clinical samples tested. No resistance was observed for Vancomycin. The highest sensitivity was observed by Linezolid and Teicoplanin (96.77%) followed by Netilmycin (89.24%), Amikacin (86.02%), Clindamycin and Gentamycin (64.51%), Ciprofloxacin (32.25%) and the least was observed by Ofloxacin (27.95%).

**Conclusion:** The frequency of MRSA infection in our hospital was found to be high and this finding highlights the need for applying appropriate infection control measures and effective antibiotic therapy.

## 86: How to tackle the problem of widespread biofilms on dry environmental surfaces in healthcare settings?

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### 1. Introduction

Microbial biofilms harbouring pathogens commonly associated with healthcare-acquired infections are widespread on dry surfaces in healthcare settings. There is little information on the impact of biocidal products on these dry biofilms because of the absence of appropriate test methodology. Here we report on a reproducible dry biofilm efficacy test to ensure product efficacy during use.

### 2. Methods

*Staphylococcus aureus* dry biofilms were produced on stainless steel discs by alternating 48 h-dry and -wet cycles for 12 days in the presence or not of organic load. These biofilms were uniform, 10 µm deep and showed exopolysaccharides. Following a 2 min treatment with 12 biocides and vaporised hydrogen peroxide (VHP), bacterial viability, transferability and regrowth from dry biofilms were measured.

### 3. Results

Only PAA-based biocide managed to reduce *S. aureus* viability by 6 log<sub>10</sub> CFU/ml. The majority of biocides (10/13) failed to prevent the transfer of bacteria from dry biofilms post exposure. Only PAA and NaOCl – based biocides reduced transferability to <50%. Regrowth of the dry biofilms was observed post-exposure with 10 biocides within 1-2 days. Only one biocide stopped regrowth for >6 days.

### 4. Discussion

*S. aureus* dry biofilms responded poorly to the majority of biocides and VHP, which are known to be efficacious against dry bacterial inoculum on surfaces as tested by standard efficacy tests. Since dry biofilms harbouring pathogens are widespread in healthcare settings, the lack of activity of common disinfectants is of a concern as is the apparent high bacterial transferability following biocidal exposure.

## 100: Impact of laboratory susceptibility testing methodologies on empirical antimicrobial choices for the treatment of *E. coli* bacteraemia

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** *E. coli* blood stream infections are a significant cause of morbidity and mortality, with rates rising year on year in the United Kingdom. In addition, there have been reports of increasing co-amoxiclav resistance amongst *E. coli* isolates. Currently, the testing methodologies to determine co-amoxiclav resistance recommended by EUCAST and CLSI differ. This study aimed to establish the rate of reported co-amoxiclav resistance amongst *E. coli* blood stream isolates and to determine if this was being influenced by testing methodologies.

**Methods:** Retrospective data spanning 30 months was collated from the routine susceptibility testing (by VITEK<sup>®</sup>2 and disc susceptibility method) of *E. coli* isolates from blood culture samples submitted to our laboratory. A panel of 86 *E. coli* isolates tested by these methodologies from May 2017 to November 2017 were selected, to include 20 that were sensitive by both methodologies, 22 resistant, and 45 which had discrepant results. These isolates were tested using co-amoxiclav ETest<sup>®</sup> strips.

**Results:** In January 2017 there was a change in the formulation of co-amoxiclav used by the VITEK<sup>®</sup>2, from a 2:1 ratio of clavulanic acid to a fixed concentration. This coincided with a significant rise in co-amoxiclav resistance amongst *E. coli* bloodstream isolates which has been sustained. The rise was not mirrored by disc susceptibility testing or ETest<sup>®</sup> strips.

**Conclusion:** This study reports how changing susceptibility testing methodologies can impact on reported resistance rates and highlights the impact this may have on empirical antimicrobial prescribing and antimicrobial stewardship.

## 125: Antimicrobial efficacy of metals against medically relevant antimicrobial resistant bacterial biofilms

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Antimicrobial resistance (AMR) due to persistent overuse of antimicrobials, including antibiotics, has led to a dramatic increase in AMR bacteria. This presents major concerns to patient health, due to increased mortality rates associated with AMR infections. Bacteria are isolated from a wide range of hospital surfaces. If left unchecked bacteria, often from biofilms can be transmitted from surfaces to patients. Biofilms are problematic as they demonstrate greater resistance to antimicrobials than their planktonic counterparts. This study aimed to assess the antimicrobial activity of three metals against bacterial biofilms, in order to produce an effective antimicrobial surface coating for use on hospitals surfaces.

Rhenium, thallium and yttrium were tested against biofilm-forming, nosocomial strains of *Klebsiella pneumoniae* and *Acinetobacter baumannii*. The antimicrobial effect of the metals was tested using a developed crystal violet biofilm assay; this allowed the metals to be tested at different concentrations and at varying time-points. Epifluorescence microscopy was used, utilising a Live/Dead stain, to visualise and capture images of the metals activity against the biofilms. Live and dead cells were quantified using percentage coverage analysis. Against *A. baumannii* and *K. pneumoniae* biofilms yttrium exhibited the greatest antimicrobial effect, whilst rhenium demonstrated little efficacy. Higher concentrations of the metals were required to inhibit growth and to destroy the biofilms, in comparison to their planktonic counterparts. Future work will examine the mode of action of these metal ion solutions against the bacteria.

## 129: Antimicrobial and antibiofilm activity of various wound dressings against clinical isolates of *Acinetobacter baumannii*

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

*Acinetobacter baumannii* is a Gram-negative opportunistic pathogen included in the 'ESKAPE pathogens' list of bacteria most often associated with nosocomial infections. *A. baumannii* is a cause of hospital acquired pneumonia (HAP), ventilator acquired pneumonia (VAP) and skin and soft tissue infections (SSTIs), often causing infection in wounds such as burns. Additionally, the occurrence of antimicrobial resistant isolates continues to rise globally, with the need for antimicrobials effective against carbapenem-resistant *A. baumannii* now classed as critical by the World Health Organisation. In this study, 12 clinical isolates of *A. baumannii* and the type strain *A. baumannii* ATCC 19606 were included. Antimicrobial activity of test articles was assessed using the zone of inhibition (ZOI) and minimum inhibitory concentration (MIC) broth microdilution methods. For the ZOI, Tryptone Soya agar (TSA) was inoculated with overnight cultures adjusted to  $1 \times 10^8$  CFU/mL. Test articles were placed in the centre of the inoculated agar and plates were incubated overnight at 37°C. ZOI was measured using digital callipers. For MIC determination, test articles were serially diluted 2-fold in TSB in 96 well plates. Bacterial strains were added at a final concentration of  $5 \times 10^5$  CFU/mL and plates were incubated overnight at 37°C. The following day the MIC was determined visually as the minimum concentration required to inhibit growth. Antibiofilm activity was assessed using the CDC bioreactor and MBEC biofilm models following ASTM E2871-13 and ASTM 2799-17, respectively. Results demonstrated efficacious activity of test articles against *A. baumannii* within the planktonic and biofilm phenotypic states.

## 137: The establishment of an *in vitro* wound biofilm model

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Acute and chronic wounds represent a large burden on healthcare. Biofilms formation in acute and chronic wounds is associated with delayed wound healing, leading to inflammation and infection. Biofilms show an increased tolerance to antimicrobials compared to their planktonic counterparts and are consequently difficult to treat. Effective treatments to eradicate biofilms from wounds are therefore needed. An *in vitro* wound model was set up to evaluate the efficacy of wound dressings against *Pseudomonas aeruginosa* using the drip flow biofilm model and following an adapted version of ASTM E2647 13. Two models were set up with either membrane systems or pig skin obtained from a local abattoir. An overnight culture of *P. aeruginosa* was adjusted to 0.5 Mcfarland ( $1 \times 10^8$  CFU/mL) and used to inoculate the models. Models were incubated in continuous flow phase for 24 hours. Biofilms were washed with 10 mM phosphate buffered saline (PBS) to remove planktonic cells and various dressings were added. Samples were incubated for 24 hours. Filter systems or pig skin were then added to neutralising broth and sonicated. Samples were serially diluted in 10 mM PBS and plated onto Tryptone Soya agar (TSA) in duplicate. Plates were incubated at 37°C overnight and the following day colonies enumerated to determine bacterial cell density. Preliminary results show a robust, reproducible model for determining antibiofilm activity of wound dressings.

## **149: Evaluation of diagnostic accuracy and agreement between four phenotypic carbapenemase detection methods using clinical *Enterobacteriaceae* isolates at a diagnostic laboratory of Pakistan**

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<sup>1</sup>Aga Khan University

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction:

Carbapenem resistant *Enterobacteriaceae* are becoming increasingly popular as a cause of hospital acquired infections that are difficult to treat and are frequently reported as causes of outbreaks in various hospitals. Conventional culturing techniques take at least 2 days to report a case as carbapenem resistant, and it is therefore important to detect such resistance mechanisms as early as possible. We therefore aim to compare the diagnostic performance of Carba NP, Modified Hodge Test, EDTA disk synergy test and the modified Carbapenem Inactivation.

### Methodology:

Carba NP, Modified Hodge Test (MHT), EDTA disk synergy test (EDTA DST) and the modified Carbapenem Inactivation Method (mCIM) were performed on consecutive isolates of *Enterobacteriaceae* at the Aga Khan University Hospital. Sensitivity, specificity, and agreement between the four tests were calculated.

### Results:

Of 207 *Enterobacteriaceae* isolated, 127 were resistant to carbapenems. 114 of these were tested by polymerase chain reaction, and the sensitivities of the Carba NP, Modified Hodge Test, EDTA disk synergy test and the modified Carbapenem Inactivation Method were found to be 94.34%, 75.47%, 79.25% and 98.11% respectively.

### Conclusion:

Due to increased rates of carbapenem resistance, there is a need to employ mechanisms in hospitals that can identify such organisms as early as possible, both from a clinical and epidemiological standpoint. The Carba NP test is a rapid, cost effective and reliable method that can be safely used for the screening of CREs in case of outbreak or infection control in the hospital setting.

## 164: A multicenter study on the prevalence of antibiotic resistance and serotypes of invasive and nasopharyngeal *Streptococcus pneumoniae* isolates

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** *Streptococcus pneumoniae* is a leading cause of morbidity and mortality worldwide. As epidemiological data regarding incidence of pneumococcal disease and antimicrobial susceptibility of pneumococci is scarce from developing countries, aim was to determine antimicrobial resistance patterns of pneumococcal isolates and correlate with the type of pneumococcal disease and serotypes.

**Methods:** Retrospective study, *S. pneumoniae* isolates were recovered from clinical and nasopharyngeal (NP) specimens from two tertiary care hospitals in New Delhi, India. Identification was done by standard microbiological procedures. Antimicrobial susceptibility using disk diffusion was performed for chloramphenicol, trimethoprim-sulphamethoxazole (TMP-SMX) and vancomycin. MICs for penicillin, azithromycin, levofloxacin, and ceftriaxone were determined by E-test. Selected isolates were serotyped using type/group-specific antisera.

**Results:** A total of 153 non-duplicate pneumococcal isolates (58, 63, 10 and 22 from pneumonia, pneumonia with concomitant sepsis, meningitis and NP carriage respectively) were collected. All meningeal and NP isolates were susceptible to penicillin and ceftriaxone (MIC 0.006-0.125 mcg/ml). Among non-meningeal isolates, penicillin and ceftriaxone susceptibility was 97.5% and 96.6% respectively (CLSI), 70.2% and 90.8% respectively (EUCAST). High level of resistance was observed to levofloxacin and TMP-SMX among both clinical (13%) and NP (38.9%) isolates. MDR was observed in 7.6% clinical isolates, 2 were pan resistant. Mortality rate was 10%; all had at least one underlying disease. Most prevalent serotypes were 19F, 1, 7F, 12F, 18 (clinical samples) and 19F (NP carriage).

**Conclusion:** *S. pneumoniae* remains susceptible to penicillin. Emergence of non-betalactams and multidrug resistance among *S. pneumoniae* requires continuous monitoring of resistance, restricted use of antibiotics and to focus attention on pneumococcal vaccination.

## 170: A highly active ruthenium-based antimicrobial compound for targeted chemotherapy against methicillin-resistant *Staphylococcus aureus*

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Antimicrobial resistance in bacteria is an ever-increasing global problem with very few novel antimicrobial agents being introduced into the clinical setting. Compounds based on metals from the platinum-group including, ruthenium (Ru), rhodium and platinum have previously been exploited for use in anticancer chemotherapy. Previous work has shown that Ru-based compounds also have potent antimicrobial properties. Objectives: We have applied the principles of drug repurposing and have identified a candidate Ru-based anticancer agent which also demonstrates potent selective antibacterial activity against methicillin-resistant *Staphylococcus aureus* (MRSA). Methods and Results: Using antimicrobial testing methods, we showed that Chlorido( $\eta^6$ -p-cymene)(N-(4-chlorophenyl)pyridine-2-carbothioamide)ruthenium(II) chloride was highly active at inhibiting MRSA growth at 8  $\mu\text{g}/\text{mL}$ , but lacked notable activity against Gram-negative pathogens. Furthermore, time-kill assays showed bactericidal activity occurred rapidly and by 4 h all MRSA cells were rendered non-viable. In vivo toxicity and infection studies suggest this compound is well tolerated at biologically-relevant concentrations within the *Galleria mellonella* insect model. Molecular *in vitro* characterisation suggests this compound targets cellular DNA as a putative mechanisms of antibacterial activity, and further biochemical and physical techniques are now being employed to quantify this drug-DNA binding affinity. Conclusions: Repurposing drugs which have passed through various stages of *in vivo* modelling represents a compelling advantage over completely new compounds in terms of timeframe and cost for potentially entering commercial medicinal use. These findings make a significant contribution towards the search for novel antibacterial agents in order to help combat the seemingly unstoppable rise of antibiotic resistance.

## 176: Multiple multi-resistant organism infection in a return traveller

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

*Acinetobacter baumannii* and *Candida auris* are associated with nosocomial outbreaks. They can be multidrug resistant and are highly transmissible between patients and the environment. To have both in one patient is certainly a management and infection control dilemma.

A 56 year old male sustained multiple injuries after a road traffic accident in Nairobi, Kenya, where his treatment included craniotomy, chest drains and antibiotics (Vancomycin and Meropenem).

He was stabilised and transferred to the UK and was isolated in an ICU room. *C. auris* was initially isolated from his blood culture and it was only fully sensitive to Amphotericin and Flucytosine. Subsequently, *A. baumannii* was isolated, initially from the sputum, pleural fluid and then blood culture but it was resistant to all antibiotics tested including meropenem (Tigecycline had the lowest MIC) but for Colistin.

Though high doses of Caspofungin and Amphotericin treated the *C. auris* effectively, the inflammatory markers only improved after Meropenem was added and Colistin dose increased in addition to the high dose Tigecycline. This illustrates the effectiveness of high dose combination therapy *in situations* of confirmed phenotypic resistance.

Two other patients got colonised with the *Acinetobacter* leading to a 24 hour shutdown of the ICU. Screening of other patients and environmental sampling was negative. Thus, staff spread was the likely culprit but decontamination, including use of hydrogen peroxide, and strict infection control practices ensured no new cases were identified subsequently.

While MALDI-TOF correctly identified *C. auris*, The VITEK wrongly identified it as *C. haemulonii*.

## 180: Linezolid- and glycopeptide-resistant *Enterococcus faecium* isolated from a haematology unit

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** Glycopeptides and linezolid are important antimicrobial agents used in Haematology to treat Gram-positive infections in neutropenic patients.

**Methods:** After isolating linezolid- and glycopeptide-resistant *Enterococcus faecium* (LGREFM) from Haematology patients during 2017, we reviewed the laboratory information system to identify all isolates confirmed as linezolid- (MICs = 8 mg/L) and vancomycin-resistant (MICs  $\geq$  32 mg/L) by the National Infection Service, PHE Colindale. The resistance mechanism for linezolid was determined by molecular investigations.

**Results:** LGREFM were isolated from nine patients on the haematology unit. These were mainly from faeces samples in patients with diarrhoea (where vancomycin-resistant enterococci are routinely sought for infection control purposes), however three patients had LGREFM isolated from urine samples and one from a blood culture. Resistance to linezolid was due to the chromosomal G2576T 23S rRNA mutation. Molecular typing by PFGE in seven patients demonstrated that four strains were unique, one patient had two similar isolates (but distinct from the others) and two patients had isolates with similar, but not identical, profiles. The monthly quantity of linezolid issued to the Haematology Unit showed an increase during the summer and autumn of 2017.

**Conclusion:** There was an increase in LGREFM isolates in the haematology unit from May 2017, which were associated with an increase in linezolid use, in part related to a shortage of vancomycin. PFGE typing demonstrated that most of the isolates were unique, so cross-infection probably played, at most, a minor part in this cluster of LGREFM.

## **207: Knowledge, Attitude, and Practice (KAP) of self-medication antibiotics abuse in common cold among Mansoura University students, Egypt**

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Unnecessary use of antibiotics is a significant public health problem in Egypt.

A cross-sectional study was carried out at Mansoura University of both medical and non-medical faculties during the academic year 2017-2018. Sample size was 810 using a multistage, stratified, cluster sampling technique. A semi-structured questionnaire was used including demographic data, source and frequency of antibiotics used, students' knowledge on the purpose of using antibiotic, efficacy, safety and reasons leading to antibiotic resistance, with five-point Likert scales being used to determine the attitudes and practices.

The mean age was  $20.2 \pm 1.7$ , equal gender. 56.4% were urban, the medical sector represented 20%. The frequency of antibiotic use in the last year was  $\geq 3$  times among 54.9%.

Students reported that the main sources of antibiotic were purchased from pharmacies without a prescription (44.1%), Left-over (6%) other sources e.g. friends (4.6%). The Total Mean score of knowledge was 7.6 (3.01), attitude was 33.3 (5.4), practice was 31.1 (6.3).

The College type, academic grade, residence, medical family member were the significant predictors of antibiotic KAP. The poor (KAP) were prevalent among non-medical than medicals (88.4 %, 36.9% and 52.6%; among non-medical students versus (19.6%, 10.4%, 31.9% among medicals).

To conclude, gaps in the KAP of self-medication and the abuse of antibiotics were observed. Therefore, we recommend that a national health education programs should target these gaps with enforcing antibiotics regulations at a national level.

## 221: OXA-48 positive *Klebsiella pneumoniae* colonization and infection: application of a predictive scoring system to guide empiric antibiotic therapy

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** An algorithm incorporating the Giannella risk score (GRS) and INCREMENT-CPE score (ICS) has been validated for indicating empiric therapy in patients colonized with *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae*. Risk factors for the development of infection in patients colonized with OXA-48 positive *Klebsiella pneumoniae* (OXA48-KP) are not well understood.

**Methods:** Over a three year period, 76 patients with evidence of OXA48-KP infection or colonization were identified from laboratory records. Devised from assigned scores for defined risk factors; the GRS was applied retrospectively to clinical records. Incorporating clinical parameters, Pitt bacteraemia score and Charlson comorbidity index; ICS scores for the 29 cases with infection were retrospectively calculated.

**Results:** Four patients (5.2%) had a blood stream infection (BSI), 25 patients (32.9%) had clinical infection without BSI (CI), and 47 patients (61.8%) were asymptotically colonized. Mean GRS scores for the BSI, CI and asymptomatic colonization group were 3.75, 1.64 and 0.21 respectively. None of the patients with asymptomatic colonization developed infection. Mean ICS scores in the BSI and CI groups were 5.0 (range 3-8; n=4) and 4.8 (0-15; n=25). The mortality rate for patients who received inappropriate antibiotics according to the GRS/ICS algorithm was 50% (2 deaths, n=4).

**Conclusion:** To our knowledge, this is the first study examining the applicability of a scoring system for predicting the development of OXA48-KP infection. Correlation with GRS scores suggests that early application of the algorithm could provide useful guidance for initial antibiotic choice. Prospective evaluation is needed to further understanding.

## 242: Prevalence and characterization of antimicrobial resistance of *Salmonella* serotypes isolated from pet animals in Tripoli, Libya 2017-2018

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** *Salmonella* is an enteric and foodborne pathogen of global concern which can cause serious gastrointestinal illnesses and outbreaks infections in humans. *Salmonella* is also an important zoonotic pathogens however epidemiological information of animal origins are limited, particularly from the underdeveloped regions. The aims are to investigate the prevalence and the susceptibility to antimicrobial agents of *Salmonella* among healthy and non-healthy (diarrhoeic) cats and dogs.

**Methods:** Faecal samples were rectally collected using sterile cotton swaps, processed then inoculated into buffered peptone water broth. Samples were then streaked onto xylose lysine decarboxylase agar and typical suspected colonies were subjected to cultural and phenotypic characterization then confirmed using API 20E system. The confirmed isolates were serotyped and subjected to antimicrobial susceptibility tests.

**Results:** 151 animals were included representing 103 cats and 48 dogs. 27/151 (18%) were positive for *Salmonella* representing 24 cats and 3 dogs. Of these, 25/27 (92%) were healthy animals and 2/27 (7%) were diarrheic animals. 27 *Salmonella* isolates were collected of which 25 were serotyped as Thompson, one each as Kentucky and Minnesota serotype. The Kentucky serotype was originated from diarrhoeic dog and expressed multidrug resistance including to ciprofloxacin but susceptible to azithromycin, cephalosporins and carbapenems.

### Conclusions

To the best of our knowledge this study documents the first isolation cases of *Salmonella* from cats and dogs in Libya. This study also demonstrated that cats and dogs can carry and be colonized with different serotypes of *Salmonellae* of global and public health concern expressing variable susceptibility to antimicrobial agents.

## 247: A four year review of infectious complications after transrectal ultrasound (TRUS)-guided prostate biopsy

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<sup>1</sup>Beaumont Hospital

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Prospective surveillance of infectious complications after TRUS-guided prostate biopsy has been undertaken in this hospital since 2014. An antimicrobial resistance (AMR) risk assessment questionnaire is completed pre-biopsy for all men. If the man has a known history of carbapenemase-producing *Enterobacteriaceae* (CPE) OR hospitalisation abroad/in an Irish hospital with known CPE outbreak in past 12 months, the biopsy is deferred pending results of a CPE screen.

Unless CPE identified, all men take three doses of oral ciprofloxacin. If AMR risk factors are identified, a single intravenous dose of gentamicin is also administered.

Aim: We conducted a four-year review (2014-2017) of post TRUS biopsy infections in Beaumont Hospital to assess the current antimicrobial prophylaxis policy.

Results: Of 1375 biopsies, 23 men (1.7%) returned with microbiologically confirmed infections of which 18 (78%) were ciprofloxacin resistant and three (13%) gentamicin resistant. None of these patients with AMR infections were positive on the prebiopsy questionnaire. Seven patients (0.5%) had urinary tract infections (UTI) (without bacteraemia), eight (0.58%) had positive blood cultures, and eight (0.58%) had both positive blood cultures and urine. The causative organism was *E.coli* in 22 patients and four isolates ESBL positive. One patient with UTI grew *Enterococcus* spp.

Conclusion: Though overall infectious complications are rare, resistance of causative pathogens to standard prophylaxis is concerning and the AMR risk assessment did not pick up men who returned with infection caused by resistant organisms. An updated pre-biopsy risk assessment is in preparation and local surveillance continues.

## 266: Antimicrobial use in cancer patients admitted to hospital in England, 2016

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<sup>1</sup>Public Health England

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

Increasing antimicrobial resistance poses a significant threat to modern day medicine. Antimicrobials are critical for the treatment of infections, particularly in cancer patients who may have compromised immune systems. To improve our understanding of the potential impact of resistance in this patient population, we conducted a study to estimate the proportion of cancer patient admissions involving the use of antimicrobials during 2016 in England.

### Methods

Data from the 2016 national point prevalence survey (PPS) on healthcare-associated infections and antimicrobial usage were analysed to ascertain the proportion of cancer patients receiving at least one antimicrobial on the day of the survey. Patients on haematology or oncology wards were used as a proxy for cancer diagnosis. Proportion of patients receiving antimicrobials was estimated through application of a random effects model to account for variation by hospital trust.

### Results

The PPS contained data from 48,312 inpatients. 1,707 (3.5%) patients were on haematology or oncology wards at time of survey. 926 patients (54%, 95% confidence interval 50–59) received at least one antimicrobial. 1,591 antimicrobial prescriptions were captured: 57% were prescribed for treatment and 32% for medical prophylaxis to prevent infection. The most commonly prescribed agents were piperacillin/tazobactam (15%), meropenem (9%) and ciprofloxacin (7%).

### Discussion

Antimicrobial resistance has great potential to undermine cancer treatment. Results from this study indicate that a large proportion of cancer patients receive antimicrobials during the course of their treatment. It is essential that antimicrobials remain effective in this patient population.

## 277: Observation of hospital level antimicrobial clinical use and *E. coli* resistance change pre-, in, and post-national action intervention in China

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Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background:

Globally concerned antibiotic resistance is comparable with climate change in its scope and scale. Evaluating diverse interventions to local benefit and contribution is good for entirety.

### Methods:

Annual antimicrobial consumption data from Sep 2009 to Aug 2018 were obtained and converted to DDDs per 1,000 patient-days in a tertiary hospital. WHO Anatomical Therapeutic Chemical classifications of antimicrobials was used to calculate defined daily doses (DDDs). And Performance Standards for Antimicrobial Susceptibility Testing (28th edition) was adopted to identify the bacterial resistance. Duplicate isolates, at the same source from the same patient within 14 days, showed the same susceptibility results, were excluded. Chinese National Action plan to reasonable clinical use of antimicrobial was implemented in the hospital in 2011-2013.

### Results :

1. The antimicrobial consumption strength in whole hospital level during National Action was reduced by 27.90% when comparing with pre-action (963.251 DDDs per 1,000 patient-days,  $p=0.000$ ), while the intensity increased 7% after the intervention ( $p=0.004$ ).
2. 4,762 *E. coli* strains were isolated from 3,955 patients identified or suspected infection during the investigation. Constituent ratio of *E. coli* resistant to single 3rd cephalosporins decreased to 38.89% (569/1463) comparing with pre-action period (242/382, 63.35%), and raised to 49.91% (1053/2110) during post-action time,  $\chi^2= 86.70$ ,  $p<0.005$ .
3. The antimicrobial consumption in the hospital were significantly related to component ratio of 3rd cephalosporins resistant *E.coli*,  $r=0.776$ ,  $p<0.02$ .

### Conclusion:

Benefit and effects of antimicrobial consumption on resistance levels are as much as local as they are global. Sustainable and more thoughtful interventions are needed.

## **278: Sensitivity of meropenem susceptibility testing as a screening method for detection of carbapenemase-producing *Enterobacteriales* (CPE)**

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<sup>1</sup>Galway University Hospital

Poster Talk 1 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Detection of CPE is important for control of spread of CPE in healthcare settings. A method to identify isolates with reduced susceptibility to carbapenems is required to select organisms from clinical specimens requiring further investigation. The European Committee on Antimicrobial Susceptibility Testing (EUCAST) released guidelines for the detection of resistance mechanisms in July 2017. This study evaluates the sensitivity of these screening methods in detecting CPE.

Methods: 50 non-duplicate CPE isolates; 15 *Escherichia coli*, 18 *Klebsiella* spp. and 17 other *Enterobacteriales* submitted to a CPE reference laboratory in 2018 were examined. CPE types included 38 OXA 48-like, 6 MBL(NDM (4),IMP (2)) and 6 KPC. Isolates were tested in duplicate on receipt in the laboratory and again following recovery from frozen stocks. Susceptibility was by EUCAST disc diffusion(10 µg), E-test and broth microdilution and interpreted using EUCAST screening break point (SBP).

Results: Using disc diffusion (SBP <28 mm zone diameter) 11-19/50 (22-38%) of isolates would not have triggered further investigation. Determining MIC by E-test and microdilution (SBP of >0.125 mg/L) would have missed 5-6/50 (10-12%) and 2/50 (4%) respectively. Of those isolates which failed to trigger further investigation 95% were OXA 48-like.

Conclusion: Using reduced meropenem susceptibility as a screening test for CPE has varying sensitivity (62-96%) dependent on the testing method utilized. The results of this study suggest that meropenem disc diffusion in isolation may fail to detect a high proportion of CPE in populations where OXA 48-like CPE predominate. This has important implications for infection prevention and control.

## 68: A dog's dinner: An interesting case presenting as gastroenteritis

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

We report a case of a 60 yr old male Caucasian with a history of alcohol excess who presented to the Emergency department with 72 hour history of abdominal pain, profuse diarrhoea and vomiting. He had generalised abdominal pain with tensing but otherwise nil was found on abdominal examination. He was grossly mottled in appearance. He was immediately admitted under the surgical team and treated initially for possible pancreatitis. The patient unfortunately deteriorated and was admitted to the Intensive Care Unit (ICU) 12 hours later in extremis with severe sepsis and multi-organ failure.

Collateral history from the patient on admission to ICU identified that he had been bitten by a dog three days prior to his symptom onset. Broad spectrum antibiotics including amoxicillin, temocillin and metronidazole were subsequently given to cover for sepsis of unknown origin and further escalated following discussion with the on call microbiologist to cover for known pathogens associated with dog bites and Group A *Streptococcus* cover.

Provisional microscopy and Gram staining from peripheral blood cultures taken on admission to ICU revealed the presence of long, thin Gram-negative bacilli in the anaerobic bottle only. This was later identified as *Capnocytophaga canimorsus*.

The patient survived the septic episode and was discharged to Level 2 care 9 days later under the care of the renal physicians for ongoing renal dialysis.

## 112: "A pox on both your houses"

**Adler H<sup>1,2</sup>**, Fletcher T<sup>1,2</sup>, Ryan H<sup>1</sup>, Singh B<sup>1</sup>, Bailey D<sup>3</sup>, Brooks T<sup>3</sup>, Beadsworth M<sup>1,2</sup>, Blanchard T<sup>1,4</sup>

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

We present a 26-year-old man who was recently admitted to the tropical and infectious unit in Liverpool. He presented with fever, vomiting and a non-crusting papulopustular rash, most prominent on the face. Twelve days previously he had returned from Zambia, where he attended a funeral at the border of the Democratic Republic of Congo (DRC). The differential diagnosis included monkeypox, and he was isolated and managed by staff wearing full personal protective equipment in the high consequence infectious disease unit. After discussion with the Imported Fever Service (IFS), swabs from the lesions were urgently transported to the Rare and Imported Pathogens Laboratory; subsequently they tested negative for orthopoxviruses and positive for varicella-zoster virus by PCR. Isolation protocols were discontinued (<24 hours after presentation) and the patient was discharged on oral aciclovir. He provided written informed consent for his case and images to be utilised for educational purposes.

Poxvirus infections—including monkeypox and smallpox—present risk of nosocomial transmission and have high case-fatality rates with no proven safe therapeutics. Smallpox has been officially eradicated, but monkeypox outbreaks still occur in central and west Africa, with over 1200 suspected cases in the DRC since January 2018. Poxvirus infections cannot always be easily distinguished from common viral exanthems, particularly in the early stages. This case emphasises the importance of risk assessment for a wide range of high consequence infectious diseases, beyond viral haemorrhagic fevers. We will discuss appropriate infection prevention and control precautions and highlight the importance of close collaboration with the IFS.

## 255: Infected sacral pressure sore and jerky movements in an elderly patient: Don't forget tetanus!

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A 72 year old patient presented to the emergency department with sepsis associated with a huge grade IV sacral pressure sore involving most of the gluteus maximus muscle, acute kidney injury and rhabdomyolysis. The patient had been found at home doubly incontinent and unable to move. The patient was a smoker with a past medical history of thyrotoxicosis and prosthetic hip replacement.

The patient was treated with piptazobactam and clindamycin and the sore was debrided. Tissue was sent for culture. The patient deteriorated and was transferred to the critical care unit and was intubated and ventilated. Myoclonic jerks were noted in the critical care unit, which seemed to respond initially to boluses of midazolam. The Gram stains of the tissue samples showed Gram-negative bacilli. The initial cultures grew *Providencia rettgeri* and *Enterococcus faecalis*. Ongoing massive jerky movements were noted. On day 3 following admission to the critical care unit, *Clostridium tetani* was grown from the tissues and the patient received treatment for tetanus in line with guidance from Public Health England. The patient continued to deteriorate and developed multi-organ failure and following discussion with next of kin treatment was withdrawn.

Tetanus is a rare diagnosis in UK. This case demonstrated a number of learning points. The diagnosis was based on culture and not clinical suspicion. Infected pressure sores represent an unusual presentation of tetanus, which may be overlooked. The incidence of tetanus associated with pressure sores may increase in an ageing population with reduced immunity to tetanus.

## 284: Pulmonary nocardiosis: A quick case review

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<sup>1</sup>*Bristol Royal Infirmary*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Nocardiosis is an uncommon lung infection caused by an aerobic actinomycete. An 82 year old gentleman gardener, with known COPD, bronchiectasis and non-resolving pulmonary exacerbations, presented with six months of mucopurulent sputum, breathlessness, and lethargy. Sputum cultures grew intermittent *Pseudomonas* for years. He was on long term nebulised antipseudomonal treatments, and received multiple courses of antibiotics over six months, with no response. CT chest showed collapse and mass like consolidation in the left lower lobe. Bronchoscopy showed no obstructing lesions. Bronchial fluid showed inflammatory cells on cytology and was weakly positive for acid fast bacilli. Later *Nocardia cyriacigeorgica* was cultured. Further assessments showed no skin or brain dissemination. Inhaled steroids were withheld, and no other immunoparesis was detected. He was given intravenous co-trimoxazole and amikacin, and symptoms and consolidation resolved. He remains on 6 months' course of oral co-trimoxazole. Pulmonary nocardia is uncommon, with increased risk in those with chronic lung disease or immunocompromised. It may mimic an exacerbation of a known lung disease. Radiologically, nocardiosis can cause pulmonary nodules, masses, infiltrates, consolidation, pleural effusions, or brain abscesses. *Nocardia* spp are gram-positive rods, and acid-fast. Most culture media can support the growth of *Nocardia* spp. Speciation is key as different strains have different susceptibility patterns. This case demonstrates a 6 month delay in recognising nocardiosis as a cause of exacerbations of chronic chest disease. We recommend increased index of suspicion to screen for this and to obtain deeper lung fluid samples more promptly in those not responding to treatments.

## **6: A retrospective review of group A *Streptococcus* bacteraemias from 2011-2017: The role of emm serotypes on the focus of infection and outcome**

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<sup>1</sup>*Kings College Hospital*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

Group A *Streptococcus* (GAS) causes infections from pharyngitis to necrotising fasciitis. In this study, we endeavoured to determine the role of serotypes on focus of infection and outcome.

### Method

We retrospectively audited our microbiology database identifying 42 cases of GAS bacteraemia between 2011-2017. Patient records were analysed to complete our data.

### Results

Of 42 cases, 25/42 had recorded emm serotypes. The most common was st1 36% (9/25) followed by st1.61 12% (3/25). Of note st1 was of prominence from 2013. From 2011-2017 the number of cases per year ranged between 5/42 to 7/42 which peaked in 2016, 9/42.

Comparing diagnoses on admission to once GAS identified: skin and soft tissue (SSTI) remained unchanged, 38% (16/42). Respiratory was 14% (6/42) versus 19% (8/42). Source-unknown was unchanged, 9% (4/42). Puerperal sepsis was 7% (3/42) versus 9% (4/42). Endocarditis and urinary were unchanged, 5% (2/42). Bone and joint was 2% (1/42) versus 5% (2/42). ENT was unchanged, 2% (1/42). The CNS group was 2% (1/42) versus 5% (2/42). Non-infection was 9% (4/42) which declined to nil. Overall 14/42 (33%) cases changed diagnosis.

There was no pattern in diagnoses by serotype other than in the st1 group, with 4/9 respiratory. ITU admissions and in-hospital mortality were 14/42 (33%) and 4/42 (9.5%). The st1 serotype made up the majority of ITU admissions (43%) with 6/9 (66%) of this group requiring ITU.

### Conclusion

The most common serotype was st1, which was particularly associated with respiratory infections; with no other pattern in serotype and diagnosis identified.

## **17: *Enterococcal* endocarditis: A recipe for acute kidney injury and high mortality**

**Dhesi Z<sup>1</sup>**, Primus C<sup>1</sup>, Ashman N<sup>1</sup>, Serafino Wani R<sup>1</sup>, Woldman S<sup>1</sup>, Das S<sup>1</sup>

<sup>1</sup>*Barts Nhs Trust*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: I (EE) is associated with significant morbidity and mortality. A particular challenge is the need for the nephrotoxic agent gentamicin. Our aim was to understand the impact of prolonged gentamicin/use of alternative regimens.

Methods: Age, sex, native versus prosthetic valve, prescribed antibiotics were extracted from our endocarditis MDT database between August 2015 and August 2017. Creatinine and estimated Glomerular Filtration Rate (eGFR) were recorded on admission and at one week. We defined significant renal impairment as a decline in eGFR >10ml/min/1.73m<sup>2</sup> or absolute eGFR <30ml/min/1.73m<sup>2</sup>. In those cases where an AKI was present, we changed to a gentamicin sparing regime.

Results: 22 patients (male = 17) had confirmed EE: 7.5% of our cohort. 3/22 patients were not given gentamicin; 1 patient did not have bloods we could access (managed at another hospital) – leaving 18 patients. 15 patients had a >10ml/min/1.73m<sup>2</sup> decline in eGFR whilst on gentamicin, 47% within the first 7 days. 8/18 (44%) patients had gentamicin stopped and switched; 6 to amoxicillin and ceftriaxone; 1 to amoxicillin and fosfomycin; 1 to vancomycin, ciprofloxacin and linezolid. 9/18 (50%) had an eGFR decline >10ml/min/1.73m<sup>2</sup> on discharge compared to admission. 7 (32%) patients died – far higher than our overall mortality of 16.9%.

Conclusion: EE has a high mortality rate with significant impact on renal function with almost 50% of patients having a significant fall in renal function requiring a change in treatment. Alternative regimens are required to treat EE and a randomised controlled trial is long overdue.

## **41: MALDI TOF: Its effect on the diagnosis and treatment of septicaemia**

**Agwuh K<sup>1</sup>**, Milupi M<sup>1</sup>, Gravid P<sup>1</sup>, Green D<sup>1</sup>, Poole M<sup>1</sup>, Gajee K<sup>1</sup>, Jewes L<sup>1</sup>

<sup>1</sup>*Doncaster and Bassetlaw Teaching Hospital NNHSs Foundation Trust*

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### Method:

We conducted a study involving positive blood cultures using the Bruker MALDI TOF Biotyper between September 2014 to March 2015 in our institution. This involved an initial four months Pre-MALDI, where positive blood cultures are reviewed by the microbiologist based on day 1 Gram film report, followed by reviews on day 2-3 on culture identification and sensitivities. The Post-MALDI consisted of a four months period as well, and involved the microbiologist reviewing the positive bloods cultures on day 1 with the Gram film report/isolate identification as given by MALDI (using the direct extraction technique), and further review on day 2. A total of 191 and 189 cases were processed for the Pre- and Post- MALDI phases respectively.

### Results:

Average number of days to final identification of bacterial/fungi in blood cultures improved from 2.0 days to 0.8 days, changes in antimicrobial therapy on day 1 improved from 18% for the Pre-MALDI to 30% for the Post-MALDI phase. Average length of bed stay was 20.8 for the Pre-MALDI compared to 17.2 for the Post-MALDI, while average length of antibiotic treatment was 12.3 and 10.3 days for the Pre- and Post-MALDI respectively. Mortality rate in both groups identified a decrease of 7% in favour of the Post-MALDI (12%), when compared to the Pre-MALDI (19%) phase. We identified 14 cases admitted to ITU/HDU in the Pre-MALDI compared to 9 cases in the Post-MALDI phase.

### Conclusion:

This study demonstrates the benefits of MALDI-TOF in management of sepsis, antibiotic stewardship and outcomes.

## 130: Investigation of school-based molecular epidemiology in an intermediate TB burden country

Kim D<sup>1</sup>, Ha J<sup>1</sup>, Kim Y<sup>1</sup>, Lee J<sup>1</sup>, Song S<sup>1</sup>, Kwon S<sup>1</sup>, Lee S<sup>2</sup>, Park M<sup>2</sup>, **Yoo J<sup>1</sup>**

<sup>1</sup>Division of Bacterial Diseases, Korea CDC, <sup>2</sup>Division of TB epidemic investigation, Korea CDC

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Tuberculosis (TB) in schools is a major public health concern because of increasing the opportunity for transmission to other students. To estimate levels of transmission and genetic diversity of *M. tuberculosis* in school level, we analyzed a total of 245 culture-positive TB isolates from 204 schools, 177 of 141 high schools, 41 of 36 middle schools, and 27 of 27 elementary schools, with molecular and epidemiological data in Korea, from 2015-2017. Of these, 78 TB patients were associated with 32 schools (2-9 episodes in a case), 28 cases of high schools and 4 cases of middle schools. The results of 24-loci MIRU-VNTR and spoligotyping revealed that 153 (62.4%) isolates had unique genotypic profiles and remains were categorized into 29 clusters. Systemic investigation of all 92 genotypic clusters, 11 cases of high schools and all cases of middle schools with multiple TB episodes were related with recent transmission. All 15 recent transmission cases, except 4 cases, were school mate transmission. One case was occurred within teachers, 1 case is associated with private educational institute, and remains were spread between family members. TB transmission rate of school setting is higher than other congregate facilities (OR=3.1 (1.3-7.1)). Our data showed the current status of TB transmission in schools in Korea. And careful interpretation of molecular epidemiology data would help in contact investigations to proper response.

### **133: Molecular epidemiology of *Mycobacterium tuberculosis* isolates among congregate facilities in Korea, 2015-2017**

**Ha J<sup>1</sup>**, Kim Y<sup>1</sup>, Lee J<sup>1</sup>, Song S<sup>1</sup>, Kwon S<sup>1</sup>, Yoo J<sup>1</sup>, Lee S<sup>2</sup>, Park M<sup>2</sup>, Kim D<sup>1</sup>

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

*Mycobacterium tuberculosis* genotyping method has been proved as an important tool for TB control and surveillance, which provides the understating of the dynamic of disease transmission. In this study, we genotyped a total of 1,931 *M. tuberculosis* isolates from 1,669 congregate facilities, such as schools, companies, and hospitals etc., with conventional epidemiological investigations from 2015 to 2017 in Korea using spoligotyping and 24-loci MIRU-VNTR. By the results of genomic typing, 1,177 genotypes were identified from 1,931 isolates. Of these, 940 (48.7%) isolates had unique genotype, while remains isolates, shared a profile with one or more other strains, were categorized into 237 clusters. Systemic investigation led to 145 patients (7.5%) being classified as having epidemiological links representing likely transmission events. And all of the transmission events were occurred from 53 facilities with 2-8 episodes in single case. More than 3 TB episodes in a facility showed higher transmission rates compare to 2 TB episodes per cases ( $P < 0.001$ ). Beijing genotype family accounted for 80.2% of all strains which showed higher genomic clustering rate (59.3%) than non-Beijing genotype strains (18.4%,  $P < 0.001$ ). But Beijing strains (16.6%) does not seem to be associated with recent transmission events compare with non-Beijing strains (10.5%,  $P = 0.344$ ). Overall, genetic diversity of TB among Korea is considerably high and there is no association between the transmission and genotypes. Adoption of whole genome sequencing would be needed to further study for comprehensive analysis.

## **143: A 6 year retrospective review of Candida bloodstream infections at St. James's Hospital: Are we following the guidelines?**

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<sup>1</sup>*St. James's Hospital*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Candida bloodstream infections (BSIs) are common healthcare-associated infections. They are associated with significant morbidity and mortality and usually affect immunocompromised hosts and patients in critical care.

**Aim:** We reviewed the epidemiology of Candida BSIs, patient risk factors and management. We specifically assessed adherence to recent published guidelines in our hospital.

**Methods:** A 6 year retrospective audit was performed which included all patients with Candida BSIs based on the Microbiology laboratory information system. The following data was collected: Candida spp, phenotypic antifungal susceptibility results, patient demographics, source investigations, treatment and outcome. The ECMM Candida EQUAL score was utilised and calculated to determine compliance to guidelines.

**Results:** There were 135 patients with Candida BSIs during the review period. The mean age was 61 years and 58.45% were males. 66 out of 143 episodes of BSIs were caused by *C. albicans* (45%). Of note, 7 patients had more than one Candida spp isolated. Intravascular catheters (CVC) were the most common source of BSIs, 92 out of 143 episodes (62%). The mean EQUAL scores were 19 and 17.4 for CVC and non-CVC carriers respectively (Maximum score 22 and 19). The lower scores were related to delays in removing CVCs and not commencing echinocandin therapy initially.

**Conclusion:** Candida BSIs impact significantly on patients' outcome. The ECMM Candida EQUAL score was a quick and simple method for evaluating adherence to guidelines in management of Candida BSIs. However, specific patient-guided deviations from echinocandin therapy, led to lower scores, despite appropriate management.

## 154: Does cold atmospheric air plasma treatment hinder blood removal from a stainless steel surface?

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

The antimicrobial effect of cold atmospheric pressure plasma (CAPP) may offer a novel hospital surface disinfection strategy. Decontamination of surfaces involves removal of soil and disinfection of potential pathogens. An important factor in the any disinfectant is that it should not negatively affect cleaning by fixing protein to surfaces.

### Objective:

To confirm the activity of CAPP against bacteria in biofilms and to determine if cold plasma affects detergent cleaning when used to treat a blood spillage.

### Methods:

*Staphylococcus aureus* and *Escherichia coli* biofilms grown on various hospital surfaces were exposed to plasma for 90 or 120 seconds. Biofilm viability was measured using resazurin staining. To evaluate CAPP's affect on surface soil, blood coated surfaces were exposed to CAPP prior to detergent cleaning. Surfaces were visually inspected and protein concentrations remaining on the surface after washing were quantified using a bicinchoninic acid assay.

### Results:

CAPP treatment reduced *Staphylococcus aureus* and *Escherichia coli* biofilm viability by up to 80%. Visual inspection of soiled surfaces showed that CAPP did not hinder the normal cleaning procedure for blood spills and blood protein concentration remaining on surfaces after washing was also not increased after plasma treatment.

### Conclusions:

This study demonstrates the effective killing of *Staphylococcus* and *Escherichia coli* biofilms on hospital surfaces by cold atmospheric air plasma treatment. The action of cold plasma does not appear to interfere with detergent removal of blood from stainless steel.

## **251: Can whole genome sequencing and MALDI-TOF identify vancomycin resistant *Enterococci* transmission events in haematology inpatients?**

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<sup>1</sup>Sheffield Teaching Hospitals NHS Foundation Trust, <sup>2</sup>Royal United Hospitals Bath NHS Foundation Trust

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Healthcare-associated infections caused by multi-drug resistant enterococci cause significant morbidity and mortality. Over the past 5 years, an increased rate of colonization and infections by vancomycin-resistant *Enterococci* (VRE) has been observed at Sheffield Teaching Hospitals Foundation Trust (STHFT) particularly in haematology patients. In this project, WGS and MALDI-TOF was used for identification and assessment of strain relatedness of VRE isolates in haematology patients at STHFT. Three arms of this project aimed to; assess the discriminatory ability WGS against existing PFGE methodology, assess mixed strain variation in single patient screening swabs and to assess the benefits of WGS for identifying cross-transmission events. WGS was shown to be comparable to current PFGE typing and when combined with patient movement data, was able to identify two potential transmission events within haematology wards at STHFT. Mixed strain carriage was also detected in two patients from multiple colony assessment. Results show WGS as a useful tool for assessment of phylogenetic analysis and, when combined with epidemiological data is proven to be a powerful method for identification of transmission events.

## **252: Dalbavancin use in single stage revision lower limb arthroplasty**

**Williams E<sup>1</sup>**, Wilson S<sup>1</sup>, Townsend R<sup>1</sup>, Lynch A<sup>1</sup>, Buckley S<sup>1</sup>, Ronksley A<sup>1</sup>

<sup>1</sup>*Sheffield Teaching Hospitals NHS Trust*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

We reviewed the use of dalbavancin in nine patients undergoing single stage revision lower limb arthroplasty over a 6-month period. These patients all had Gram positive isolates sensitive to dalbavancin, which was administered as a single dose instead of the usual practice of 14 days of intravenous antibiotics. We reviewed the safety, cost efficiency and outcomes of these patients. Our findings were that on average it saved 5.3 inpatient bed days and was well-tolerated with no adverse reactions or infection-related complications. The savings in bed days are not only cost-saving but also beneficial in terms of minimising the potential for hospital-acquired infections. With some further streamlining of the process, there is great potential for the use of dalbavancin in these patients.

## **260: Microbiological and clinical significance of contamination of organ preservation fluid (OPF) in orthotopic liver transplantation (OLT): a single centre analysis**

**Creedon M**<sup>1</sup>, Ramlaul N<sup>1</sup>, Stafford A<sup>1</sup>, McDermott S<sup>1</sup>

<sup>1</sup>St. Vincent's University Hospital

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Introduction: Contamination of OPF is a potential source of infection post-solid organ transplantation. Commencing July 2016, samples of OPF were routinely sent for culture and susceptibility testing in the National Liver Transplant Unit, SVUH. Initially, OPF was collected into universal containers however, this protocol was later revised such that OPF was collected into blood culture bottles for laboratory processing.

Aim: To determine the microbiological characteristics of OPF cultures, ascertain their clinical significance and evaluate their impact on post-operative infections in OLT patients. A secondary aim was to evaluate the impact of the change in laboratory protocol on the rate of positive OPF cultures.

Methods: A retrospective analysis of OPF cultures from patients undergoing OLT in SVUH between July 2016 and June 2018 was undertaken. Data was collected from the laboratory information management system (Apex) and patients' clinical notes.

Results: Data was analysed from 100 OLTs, revealing positive growth in 43 cases. Most positive cultures yielded skin flora only. Sixteen samples produced growth of "high risk", potentially pathogenic organisms, e.g., *Enterobacteriales*, *Enterococci*, *Staphylococcus aureus* and *Candida albicans*. One of these 16 patients developed a superficial surgical site infection with similar organisms cultured from OPF as from wound swab (*Candida albicans* and *Enterococcus faec*). The rate of positive cultures increased from 20% (14/70) to 96.7% (29/30) when the laboratory protocol was changed, with a increase in the rate of "high-risk" cultures from 8.6% (6/70) to 33.3% (10/30).

## 273: Potential presence of microsporidia in clinical faecal specimens from the Isle of Man

**Hoosen H<sup>1</sup>**, Izquierdo F<sup>2</sup>, Sheilds R<sup>3</sup>, Helm C<sup>3</sup>, Khan R<sup>3</sup>, del Águila C<sup>2</sup>, Fenoy S<sup>2</sup>, Peña-Fernández A<sup>1</sup>  
<sup>1</sup>De Montfort University, <sup>2</sup>Universidad San Pablo CEU, <sup>3</sup>Noble's Hospital

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Human-related microsporidia *Enterocytozoon bieneusi* and *Encephalitozoon* spp. have emerged as opportunistic infectious agents affecting immunocompromised and immunocompetent individuals. A pilot study to determine the potential presence of microsporidia in the general population that have attended Nobles' Hospital in Isle of Man since January 2018 was performed. Thirty eight faecal samples submitted to the Nobles' Hospital microbiology lab for routine testing were analysed via microscopy using the Modified Trichrome stain. *Encephalitozoon* spp. spores were observed in 4 samples, 3 female from a range of ages (24 yr, 65yr and 89 yr old) and one male (69 yr old). These four patients were presented with diarrhoea in a semi-liquid/liquid form. Other symptoms included vomiting (89 yr old female), abdominal pain (24 yr old female), right flank pain (68 yr old male), dehydration (89 yr old female) and acute kidney injury (89 yr old female). *Campylobacter* spp. growth was also detected in one sample (65 yr old female). Although preliminary, our results indicate *Encephalitozoon* spp. were observed in faecal samples from patients in the Isle of Man presenting with diarrhoea. Further studies will be required to determine the species and the pathogenic involvement of these pathogens in these patients. To our knowledge, this is the first study of the presence of microsporidia in human faecal samples in Isle of Man. A more comprehensive study is needed to determine the occurrence of microsporidia in patients attending with a diarrheic picture to focus attention on the need to include microsporidial diagnosis in their management.

## 14: Microbiological evaluation of UV disinfection effectiveness in the specialised cystic fibrosis clinic

**Allen O<sup>1</sup>**, Athithan V<sup>1</sup>

<sup>1</sup>Royal Papworth Hospital NHS Foundation Trust

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Over 50% of patients attending cystic fibrosis (CF) clinics at Papworth Hospital are infected with multi drug resistant bacteria that are transmissible and associated with worse clinical outcomes. Therefore, preventing cross infection of these bacteria during clinics is of paramount importance.

The aim of the study was to evaluate and compare the effectiveness of UV disinfection between patients in various CF clinics with the current disinfection method - wiping surfaces with chlorine-containing solution (Tristel).

Hygiene Solutions UV light machine was used for the study.

Ten rooms were tested from the following clinics: LES (Liverpool Epidemic Strain) *P. aeruginosa*, non-LES *P. aeruginosa*, ESBL, MRSA and *Mycobacteria abscessus*.

The following surfaces were sampled: desk, patient's chair, water tap handle and sink upper surface, indoor handle and the adjacent door surface, spirometer.

Patient rooms were tested with contact agar plates 3 times: immediately after the patient has left the room, 2 minutes after standard disinfection by Tristel wipes and immediately after UV disinfection.

Disinfection with Tristel alone showed variable results: some reduction in total viable count (TVC) was achieved on some surfaces. However, in the number of cases no reduction or even increase in TVC was observed. In contrast to Tristel, UV disinfection showed significant and persistent reduction in TVC across all surfaces and in many cases down to zero.

The study demonstrated that UV disinfection is highly effective in eliminating bacteria from surfaces in the healthcare environment that is likely to be contaminated with multi-resistant organisms and especially in CF clinics.

## 18: Challenging the six-hour recommendation for reprocessing sterilisable medical equipment

**Bundgaard K<sup>1,2</sup>**, Sørensen E<sup>1,3</sup>, Ripadal K<sup>4,5</sup>, Christensen A<sup>5,6</sup>, Schønheyder H<sup>3,7</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

At present, the reprocessing of sterilisable medical equipment must be initiated no later than six hours after completion of surgery to ensure that the quality of the instrument does not deteriorate. A systematic review showed a lack of evidence for the consequences that may occur if medical personnel deviate from the standard six-hour sterilisation protocol.

### Aim

This study challenges the six-hour recommendation for reprocessing sterilisable medical equipment. We investigate whether an increase in residual protein content is present proportional to holding time before reprocessing is initiated and whether an increase in corrosion is present on surgical scissors proportional to holding time before reprocessing is initiated.

### Method

Residual protein was identified on surgical instruments contaminated with human blood after different holding times and before washes using the o-phthalaldehyde (OPA) method. Corrosion was identified on surgical scissors contaminated with human blood after different holding times and before reprocessing using a scanning electron microscope (SEM).

### Results

No association between residual protein and holding time was identified. Protein residues were well below the consensus-accepted threshold of 100 µg per instrument surface. Corrosion was identified as areas with red-coloured deposits and lighter discoloration. Pitting corrosion was identified on four out of 30 scissors. No association between holding time and degree of corrosion was identified.

### Conclusion

The study challenges the relevance of upholding the recommendation of a maximum wait of six hours before reprocessing. The present study's findings will potentially have an impact on the organisation of future work for reprocessing in Denmark and internationally.

## 25: Wiping out MRSA: effect of introducing a universal disinfection wipe in a large UK teaching hospital

**Garvey M<sup>1</sup>**, Holden K<sup>1</sup>, Holden E<sup>1</sup>, Wilkinson M<sup>1</sup>, Bradley C<sup>2</sup>

<sup>1</sup>University Hospitals Birmingham NHS Foundation Trust, <sup>2</sup>Gloucestershire Hospitals NHS Foundation Trust

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Objective:** Describe the effect of introducing a universal disinfection wipe in all wards on the rates of MRSA acquisitions and bacteraemias across a large UK teaching hospital.

**Design:** Descriptive study.

**Setting:** Queen Elizabeth Hospital Birmingham (QEHB) part of University Hospitals Birmingham (UHB) NHS Foundation Trust is a tertiary referral teaching hospital in Birmingham, UK.

**Methods:** A segmented Poisson regression model was used to detect any significant changes in the monthly numbers per 100,000 bed days of MRSA acquisitions and bacteraemias from April 2013 - December 2017 across QEHB.

**Results:** From April 2013 to April 2016, cleaning of ward areas and multi-use patient equipment by nursing staff consisted of a two-wipe system. Firstly, a detergent wipe was used, which was followed by a disinfection step using an alcohol wipe. In May 2016, QEHB discontinued the use of a two-wipe system for cleaning and changed to a one wipe system utilising a combined cleaning and disinfection wipe containing a quaternary ammonium compound. The segmented Poisson regression model demonstrated that the rate of MRSA acquisition/100,000 patient bed days was affected by the introduction of the new wiping regime (20.7 to 9.4 per 100,000 patient bed days;  $p < 0.005$ ). The model demonstrated that the average hospital acquisition rate of MRSA/100,000 patient bed days reduced by 6.3% per month after the introduction of the new universal wipe.

**Conclusion:** We suggest that using a simple one wipe system for nurse cleaning is an effective strategy to reduce the spread and incidence of MRSA across a hospital.

56: Reduction of residual protein on re-usable surgical instruments using pre-treatment formulations **Bacon P<sup>1</sup>**, Terry A<sup>1</sup>

<sup>1</sup>Quadralene Ltd

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

There is widespread concern about the potential for transfer of prion protein between surgical patients because of incomplete instrument decontamination and the resistance of prion to inactivation by routine steam sterilisation.

HTM 01-01 (UK Department of Health, 2016) states the objective that all surgical instruments should be decontaminated to a level where less than 5µg of residual protein should be detectable per instrument side using a fluorescence based in-situ protein detection method.

The objective of this work was to measure the effectiveness of a number of commercially available pre-treatment materials in increasing protein removal from surgical instruments during reprocessing. Since instruments, decontamination processes and equipment are all well-established in sterile services departments, our study sought to quantify the increase in protein removal achievable by inserting the use of a pre-treatment product into existing work-flows.

#### Experimental

Protein soil was applied to stainless steel plates and surgical instruments. The test soils used were bovine serum albumen (BSA) and fibrinogen. Various protein drying regimes and cleaning processes were used to simulate instrument use and reprocessing. Residual protein levels were assessed using the ProReveal system.

Five commercially available pre-treatment products were evaluated.

#### Results

Significantly improved protein removal was seen in all cases where any of the pre-treatment products were used. Significant differences were noted between the test formulations in the amount of residual protein measured. Surprisingly, no difference in residual protein level was measured when application of the pre-treatment was delayed by 16 hours.

## 58: Effect of soil on the efficacy of formulated and generic oxidizing disinfectants against biofilms

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Hospital grade disinfectants are used to kill bacteria dried onto hospital surfaces or incorporated into dry-surface biofilm (DSB) but their efficacy is tested against planktonic bacteria. Killing dried or biofilm bacteria is harder than killing planktonic bacteria. We tested the efficacy of formulated (containing additives like surfactants) and generic (containing only active product) oxidizing disinfectants against DSB.

Methods: *Staphylococcus aureus* DSB was grown over 12 days with cycles of hydration and dehydration. Disinfectant efficacy was tested with and without soil (10% bovine serum albumen) and  $\pm$  prior neutral detergent treatment. Disinfectants contained 1) 2200ppm peracetic acid (PAA) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) (formulated 1100ppm, generic 10,080ppm), 2) 1000ppm active chlorine or 3) 5000-6000ppm H<sub>2</sub>O<sub>2</sub>. Biofilm was treated for 5 minutes, disinfectant activity neutralized and residual viability and protein determined by standard plate culture and protein assay respectively.

Results: Formulated PAA/H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O<sub>2</sub> disinfectants were significantly better than generic products suggesting additives act synergistically, whilst formulated and generic chlorine-based disinfectant efficacy was similar. For all conditions tested, formulated PAA/H<sub>2</sub>O<sub>2</sub> disinfectant completely inactivated biofilm (6.3log<sub>10</sub> reduction). Chlorine-based disinfectants reduced biofilm viability by 2.8 Log<sub>10</sub> and generic PAA/H<sub>2</sub>O<sub>2</sub> by 2 log<sub>10</sub> without soil but failed to kill biofilm in the presence of soil. H<sub>2</sub>O<sub>2</sub> disinfectants had little effect against DSB. Detergent treatment had no effect on disinfectant efficacy under static conditions. Biofilm protein removal followed the same trend as kill.

Conclusion: Hospital grade disinfectant efficacy is significantly affected by formulation/additives and the test conditions (presence of soil). Product efficacy testing should reflect clinical use.

## 85: Reduction of *Legionella pneumophila* colonization in two hospital hot water networks after time flow taps installation.

**Totaro M**<sup>1</sup>, Casini B<sup>1</sup>, Valentini P<sup>1</sup>, Frendo L<sup>1</sup>, Giorgi S<sup>1</sup>, Privitera G<sup>1</sup>, Baggiani A<sup>1</sup>

<sup>1</sup>Department of Translational Research N.T.M.S., University of Pisa

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Objective

Evaluation of *Legionella* spp. colonization in the hot water network of two Italian hospitals after the installation of time flow taps (TFTs) in correspondence of dead-end branches.

### Methods

After the assessment the hot water consumption (about 60 m<sup>3</sup>/month) in two 60 and 401 beds hospitals, from May 2016 the continuous disinfections with chlorine dioxide and five TFTs were installed. TFTs were programmed in order to obtain an hot water flow 960L/day. Before and after TFTs installation *Legionella* spp. was searched with a monthly basis in six sampling points as described by the ISO11731 standard.

### Results

In the both hospitals, before TFTs installation, *Legionella pneumophila* sg1 and 2-14 were detected in all points with means of  $4 \times 10^4 \pm 3.1 \times 10^4$  and  $9.2 \times 10^3 \pm 1 \times 10^3$  CFU/L. In the first hospital, after eight months, *Legionella* colonization persisted in one point with counts from  $3 \times 10^2$  to  $6.8 \times 10^3$  CFU/L and it was eradicated after thirteen months. Chlorine concentration was detected in the range between 0.05 and 0.31 mg/L, while temperature values were from 38.2 to 44.9°C. In the second hospital, after two months, *Legionella* growth (900 CFU/L) was detected in one point and from the third month all samples resulted negative. Mean chlorine concentration was  $0.29 \pm 0.06$  mg/L, while mean temperature value was  $39.7 \pm 3.2$ °C.

### Conclusion

TFTs with chemical disinfection may improve the disinfectants efficacy reducing *Legionella* colonization in dead legs.

## 87: Comparison of anolyte and chlorine dioxide for a continuous hot water disinfection in a nursing home

**Totaro M<sup>1</sup>**, Casini B<sup>1</sup>, Valentini P<sup>1</sup>, Frendo L<sup>1</sup>, Privitera G<sup>1</sup>, Baggiani A<sup>1</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Objective

We compared the effect of anolyte and chlorine dioxide, applied in two different hot water networks of a nursing home to manage *Legionella* risk.

### Methods

Nursing home has two buildings (A with 39 beds; B with 42 beds), with the same point of aqueduct water entrance. Following a shock chlorination (50mg/L; 1h), aimed to remove *Legionella* colonization, from June 2016 the continuous disinfections with chlorine dioxide (0.33±0.04mg/L) and anolyte (0.23±0.04mg/L) were applied in hot networks of building A and B, respectively. From each building hot water was sampled at central heating system (recirculation; boiler) and at two points of use as suggested by water safety plan. *Legionella* research (ISO11731) was performed with a monthly basis while chemical tests of iron ions (Fe), manganese ions (Mn), zinc ions (Zn) and trihalomethanes (THM) were fulfilled with a quarterly monthly.

### Results

Before shock chlorination *Legionella pneumophila* sg1 was recovered in all buildings from 2x10<sup>2</sup> to 3.8x10<sup>4</sup>CFU/L, while chemical compounds concentrations were within the limits provided by Directive 98/83/EC. After the application of the continuous disinfections, *Legionella* was not recovered in water samples and physical-chemical data were comparable between both buildings. From water samples treated with anolyte we detected 54±7.7µg/L of Fe; 1.7±0.3µg/L of Mn; 85.7±9.6µg/L of Zn; 1.7±0.9µg/L of THM. From water samples treated with chlorine dioxide we obtained 22.8±3.6µg/L of Fe; 11.8±3.3µg/L of Mn; 106.4±12µg/L of Zn; 13.2±1.9µg/L of THM.

### Conclusion

Both disinfectant appears effective against *Legionella* growth in water network, but anolyte ensure a lower disinfection byproducts (THM) release.

## **102: Reducing the environmental burden of bacteria (VRE) on a haematology ward through decontamination with UV**

**Shabir S<sup>1</sup>**, Hardy K<sup>1,2</sup>, Abbott G<sup>1</sup>, Hussain A<sup>1,2</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Vancomycin resistant enterococci (VRE) can survive for months within the hospital environment and routine detergent cleaning of the environment has been shown to be ineffective. This study aimed to establish if the environmental burden of VRE could be reduced on a haematology ward where there is a high level of VRE colonisation.

Eight touch points within individual patient rooms were sampled prior to routine detergent cleaning, post routine cleaning and post UV decontamination. RODAC plates were used to determine total viable aerobic colony counts. To establish VRE contamination a 10cm<sup>2</sup> area was swabbed using a flocced eSwab and placed in 10ml of BHI broth, incubated overnight and sub-cultured onto VRE selective agar. The VRE status of the patient in the room was recorded.

UV has been utilised in 150 side rooms, with 10% of these being sampled. The mean bacterial count per sites sampled was 40cfu prior to cleaning, 16cfu post routine cleaning and 0.3cfu (min 0cfu and max 6cfu) post UV. Patients colonised with VRE were present in three of the rooms, and VRE was isolated from all three rooms prior to cleaning, two rooms post routine cleaning and from only one site (under patients bed) post UV.

Using UV as a method of terminal decontamination upon discharge is a time efficient and effective method of ensuring the bacterial burden and VRE in the environment is reduced. The longer term effect of continued UV decontamination on the acquisition rates of VRE colonisation and infection is being monitored.

## 104: Evaluation of an ultraviolet C (UVC) light-emitting device for disinfection of high touch surfaces in hospital critical areas

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Objective:** To evaluate an UVC light-emitting device in reducing environmental bacterial burden when compared to the current standard operating protocol (SOP)

**Methods:** In a 1158-bed hospital, according to the SOP, housekeeping staff applied an alcohol-based detergent (Keradet, Kiehl) followed by a chlorine-based disinfectant (Antisapril, Angelini). The UVC light-emitting device (Pulsed-Xenon Ultraviolet Light, PX-UVC, Xenex) was located in each room after the SOP procedure.

Effectiveness in reducing bacterial burden and in eliminating high concern microorganisms was assessed by a plate or sponge contact method on five high touch surfaces, immediately pre- and post-procedures (345 sampling sites).

**Results:** In 9 operating rooms, 2 Intensive Care Units (ICU) and 5 patient rooms, 135 samples were collected after healthcare activity (dirt condition) and 210 after the cleaning and disinfection procedure (125 after SOP and 85 after SOP + PX-UVC disinfection).

According to the Italian hygiene standard (ISPESL, 2009), 16 of 140 surfaces in operating rooms showed TBC >50 CFU/24 cm<sup>2</sup> (hygiene failures), while all samples were compliant applying the SOP + PX-UVC disinfection. All 20 samples collected in ICU (20) and 48 of 50 collected in patient rooms were compliant by applying both protocols (Fisher-test, p<0.05). High concern microorganisms (spores of *C. difficile* and KPC-K. pneumoniae) were isolated only after the SOP whereas after PX-UVC disinfection all samples were negative. **Conclusion:** The implementation of the disinfection procedure applying the PX-UVC disinfection after the SOP resulted effective both in the reduction of hygiene failures and in control environmental contamination by high concern microorganisms

## **105: Effectiveness of accelerated hydrogen peroxide cleaning-disinfection wipes and spray in reducing bioburden in the immediate surrounding area of patients in intensive care**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Objective

To evaluate the effectiveness of accelerated hydrogen peroxide (AHP) pre-impregnated wipes and spray when compared to the standard two-step protocol (SP).

### Methods

In a 12-bed Intensive Care Unit, 6 occupied beds were subjected to different sanitisation: 2 by using the SP on all surfaces with the exception of the electro-medical devices (Keradet-Kiehl and Antisapril-Angelini), 2 using 1% AHP impregnated wipes on all surfaces (Incidin Oxywipe, Ecolab) as for the last 2 beds, using microfibre cloths (CleanOp-Microtek, Ecolab) impregnated with 1,5% AHP (Incidin Oxyfoam, Ecolab). Effectiveness in reducing microbial burden was assessed by a contact plate method on five sites immediately pre- and post-procedures (600 sampling sites).

### Results

On the 3 non-electromedical surfaces, pre-impregnated wipes demonstrated a decrease in mean Total Bacterial Count (TBC) from 35 to 6 CFU/24 cm<sup>2</sup> (82.9%), while impregnated cloths from 36 to 9 CFU/24 cm<sup>2</sup> (75,0%), vs. a reduction from 39 to 18 CFU/24 cm<sup>2</sup> (53.8%) for the SP (t-test, p <0,05). According to the Italian hygiene standard (ISPESL, 2009), when using pre-impregnated wipes 1 of 100 sites (documentation table) showed TBC >50 CFU/24 cm<sup>2</sup> (Hygiene Failures), 5 of 100 (3 on workbench, 1 bed sides, 1 monitor) using impregnated cloths, whereas for SP 11 of 100 sites (4 on monitor, 3 on workbench, 3 on documentation table, 1 bed sides) were classed as failed (t-test, p <0.05).

### Conclusion

Disposable wipes (pre-impregnated or impregnating at the time of use) provide a more effective and easier to use alternative to the usual two-step procedures.

## 107: Misleading diagnostics due to contaminated bronchoscope disinfection machine

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction:

Acid-fast bacilli and DNA from non-tuberculous mycobacteria without definite species identification (*Mycobacterium simiae/stomatepiae/sherrisii*) detected between February 2016 and November 2017 in the tracheal secretions of ten patients following bronchoscopy attracted attention at our Medical Center's Thoracic Surgery Department. Because all mycobacterial cultures remained sterile contamination was suspected. Therefore, samples were taken from bronchoscopes and the bronchoscope disinfection machine (BDM).

### Methods:

The irrigation channels of ten bronchoscopes were brushed and the brush tips examined for mycobacteria using standard methods. Additionally, swabs were taken from 20 locations within the BDM, following closely the routine cleaning and disinfection process, i.e. starting with the water supply and ending with the condensate drain.

### Results:

By applying different PCR methods, non-tuberculous mycobacteria without definite species identification (including *simiae/stomatepiae/sherrisii*) were identified in five bronchoscopes.

Culture methods revealed different atypical mycobacteria (*M. chelonae* 11x, *M. goodii* 2x, *Mycobacterium* species 2x) in BDM samples from 13 of 20 locations.

### Conclusions:

If contamination with non-tuberculous mycobacteria goes undetected, this may lead to unnecessary diagnostic procedures and, as the case may be, wrong treatment decisions.

Presence of mycobacteria at different locations in the BDM may explain bronchoscope contamination and subsequent detection in clinical specimens.

It is unclear how the mycobacteria entered the BDM. Mycobacteria were not found in the hospital's water system. Furthermore, the BDM is connected to a sterile water filter.

Contamination of BDM with atypical mycobacteria, as previously reported in the literature, remains a problem; future environmental examinations are therefore indispensable.

## 127: Decontamination of hospital beds by an automated robotic bed-washer with steam: a pilot study

Voor in 't holt A<sup>1</sup>, Waltmans-den Breejen M<sup>1</sup>, de Boer E<sup>2</sup>, van Bavel A<sup>2</sup>, **Vos M<sup>1</sup>**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The hospital environment plays an important role in spreading microorganisms from the environment to patients. Additionally, studies have shown that hospital beds are highly contaminated. Therefore, novel methods are needed to reduce the chance of transmission of microorganisms from a hospital bed. We showed that by artificially contaminating a hospital bed with tea and measuring ATP, cleaning a hospital bed manually results in a median reduction of 65% in RLU. With an automated robotic bed-washer with steam, a median reduction of 98% in RLU was observed. For this pilot study, we will use the VMARC mechanical bed-washer with steam (Weber Hospital Systems BV, Zwaag, The Netherlands) with the HR900 Arccella Hill-Rom hospital bed (Hill-rom BV, Amsterdam, The Netherlands). As artificial contamination, a combination of sheep blood with 10<sup>6</sup> CFU/mL of *Staphylococcus aureus* (ATCC 29213), *Klebsiella pneumoniae* (ATCC 13883) and *Enterococcus faecalis* (ATCC 29212) will be used. One mL of this contaminant will be applied to 5 critical points on the bed: (i) matrass, (ii), side railing, (iii) back bed railing, (iv) footboard, (v) side rail control panel. After cleaning by the automated robotic bed-washer, critical points will be sampled with the eSwab (Copan, Italy), and cultured on blood agar and MacConkey agar plates. The number of colonies will be counted and noted. Results will show if microorganisms are effectively removed by the automated robotic bed-washer cq automatic disinfection of the bed. Outcome will be the feasibility and a study method and design to prove disinfection by automatic robotic bed-washers.

## 144: Could cold atmospheric pressure plasma (CAPP) aid in the decontamination of bacterial biofilms formed on hospital surfaces?

**Kennedy S**<sup>1</sup>, Fallon M<sup>1</sup>, Daniels S<sup>2</sup>, Humphreys H<sup>1,3</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

With increasing numbers of multi-resistant micro-organisms it's imperative that more effective methods of decontamination are evaluated. Previously, our laboratory demonstrated that cold atmospheric pressure plasma (CAPP) exhibited efficient bactericidal and sporicidal activity.

### Objective

To assess the effects of CAPP on bacterial biofilms formed by *Escherichia coli*, methicillin resistant *Staphylococcus aureus* (MRSA) and *Klebsiella pneumoniae* on hospital surfaces.

### Methods

Bacterial biofilms were formed on stainless steel, powder coated steel, and glass and treated with CAPP for 90 seconds. Results were analysed using crystal violet assays to determine effects on biomass, confocal laser scanning microscopy (CLSM) to assess the ratio of live and dead cells and scanning electron microscopy (SEM) examined the morphology of the cells present after treatment. The H2DCFDA (2',7'-dichlorodihydrofluorescein diacetate) assay was performed to measure reactive oxygen species (ROS) production between treated and untreated bacterial biofilms.

### Results

The anti-microbial effects of CAPP on biofilm biomass were species and surface specific. However, CAPP treatment lead to an increase in dead cells within the bacterial biofilms analysed by confocal microscopy, and affected cell numbers and the morphology of cells observed by SEM compared to the untreated controls. There was an increase in concentration of ROS for all species following 90 second CAPP treatment, especially *E.coli* ( $P<0.05$ ) and MRSA ( $P<0.05$ ) compared to the untreated controls (Fig 1.0).

### Conclusion

CAPP applied to hospital surfaces leads to increased numbers of dead cells, disrupts cellular morphology and increases ROS. However, further research is required to confirm effectiveness against bacterial biofilm in the clinical setting.

## 155: 'Without getting in the way': Designing a decontamination intervention study to optimise sampling without impacting patient care

**Boyle M<sup>1</sup>**, Kearney A<sup>1</sup>, Stevens N<sup>1</sup>, Carling P<sup>2</sup>, Segurado R<sup>3</sup>, Codd M<sup>3</sup>, Daniels S<sup>4</sup>, Humphreys H<sup>5</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** Microbial contamination of the hospital environment is recognised vector of healthcare-associated infections. This potential threat is reduced by appropriate decontamination methods initially evaluated within a controlled laboratory setting. Translating promising I results to an active clinical environment is challenging. Often these challenges result in studies undertaken over short timespans or only targeting vacant beds, limiting their impact and scope.

**Objective:** The objective of this study was to develop a minimally disruptive environmental sampling protocol for a longitudinal decontamination intervention using cold air plasma (CAP) on an intensive care unit (ICU).

**Methods:** The study design was informed by previous literature relating to in-vitro testing of CAP and environmental surface contamination patterns in ICUs. Near-patient sites in four isolation rooms of an ICU in a tertiary referral hospital were sampled using 3M Petrifilm and swabs. Over a four-month period, adjustments to the sampling routine were made to optimize access to isolation rooms in a high acuity area without disrupting care.

**Results:** Bed-rails were identified as the most frequently contaminated near-patient site. The part of the bedrail sampled influenced the bacterial count. Access to patient rooms increased when the sampling routine was adjusted to reflect the ICU routine.

**Conclusions:** Pilot sampling identified the highest and most frequently contaminated near-patient sites to target with CAP, and optimal times to undertake this. However, the challenges of sampling the environment in critical care areas should be addressed from the outset when developing sampling protocols to optimise the methodology while avoid disrupting essential patient care.

## 165: Decontamination strategies of heater-cooler units associated with stable *Mycobacterium chimaera* and other Non-Tuberculous Mycobacteria (NTM) colonisation

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Objective:** To assess the extent of microbiological contamination within four heater-cooler units (HCUs) used in a highly specialized cardiac surgery unit and to evaluate the effectiveness of decontamination strategies in eliminating the presence of *Mycobacterium chimaera* and other NTMs

**Methods:** Water and aerosol samples were collected to determine the microbiological parameters required by the Directive 98/83/CE and to assess the presence of NTMs according to the protocol proposed by Falkinham J.O. Genotyping was performed by sequencing the hsp65 gene and ITS1-rDNA and 16S-rDNA regions. HCUs were decontaminated, with minor modification to the manufacturer's guidance, performing weekly cycles of treatment with 4,5% peracetic acid and 22% hydrogen peroxide. The replacement of internal tubing was also carried out.

**Results:** All the parameters investigated were found to comply with the potability requirements, excepted for total microbial load (>100 CFU/ml). In 3 devices, an increasing NTMs colonization was observed, with mean load from 9.5±5 to 414±396 CFU/100ml, and it was discontinuous in the last one, with a mean load of 60±34 CFU/100ml. All aerosol samples were negative. NTMs isolated in water were *M. intracellulare* in 44% of samples (strain KF4325484.1), *M. chimaera* in 33% (strain CP015272.1) and *M. goodii* in 22% (strain FJ643457.1). NTMs were no longer isolated when the modified disinfection protocol was applied.

**Conclusion:** The manufacturer's standard operating instructions were not effective in controlling HCUs colonization by NTMs, that was achieved only after the modification of the disinfection protocol and replacement of internal tubing.

## 201: Comparative efficacy of microfibre and cotton wipes on bacterial removal from dry surfaces over time.

**Chukwuemeka V<sup>1</sup>**, Mackay W<sup>1</sup>, Williams C<sup>1</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Infection control approaches for reducing transmission rates include the use of wipes to remove pathogenic bacteria from high-risk surfaces. The aim of the study was to evaluate the efficacy of microfibre and cotton wipes to remove bacteria from dry surfaces over time. A standardized concentration of *S. aureus* and *S. epidermidis* ( $1 \times 10^7$ ) to mimic the bacterial load in urine samples, was dried on glass and melamine surfaces under ambient laboratory conditions. A standardized wiping procedure was used to assess the removal efficacy of the microfibre and cotton wipes moistened with water across the surfaces, and the transferability was assessed by wiping a clean surface with the used wipes. Microfibre recorded a log reduction of 2.5 and 2.0 at T0, 2.0 and 1.7 reductions at T72 for *S. aureus* and *S. epidermidis* on glass, and on melamine 2.0 and 1.7 at T0, 1.6 and 1.4 at T72 respectively. The cotton wipe, at T0, recorded a reduction of 1.4 and 1.7 log for the same bacteria at T0, 1.0 and 1.0 at T72 respectively on the glass, and for melamine, 1.1 and 1.4 log reductions at T0 and at T72, 0.5 and 0.7 log reductions. There was a difference of 1.0 -1.5 log reductions between the microfibre and cotton wiping efficacies. The result closely represents what is obtainable practically within the hospital and hygienic surfaces, which are cleaned at a specific time rather than instantly after contamination. Consequently, other wiping assays is not a true representation of wiping efficacies on dry surfaces.

## **219: Routine decontamination of sinks with acetic acid as the key intervention in the eradication of a long-term CPE epidemic in an intensive care unit**

**Smolders D<sup>1</sup>**, Gordts B<sup>1</sup>, Hendriks B<sup>1</sup>, Mul M<sup>1</sup>  
<sup>1</sup>Zna

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Carbapenemase-producing *Enterobacteriaceae* (CPE), have become prevalent nosocomial pathogens in Belgium. From August 2011 on, several species of CPE increasingly colonized and infected patients in our 12-bed adult intensive care unit. This long-term CPE epidemic, involving over 100 patients in a 75 month period proved very difficult to control, despite the implementation of classically described measures of outbreak management. Environmental cultures identified sink drains in the ICU patient rooms as an important reservoir of Gram-negative bacteria, including CPE. A procedure was developed in order to decontaminate this reservoir and prevent recontamination.

Methods and results: Systematic decontamination of the sinks was implemented, using 250mL 25% acetic acid three times weekly. Sink drain colonization was followed up for 6 months thereafter. Both the number of CPE-colonized sinks and the patients colonized or infected with CPE decreased drastically, to the extent that the epidemic was considered to be eradicated. The susceptibility patterns of most CPE strains proved sensitive to meropenem and all were inhibited by acetic acid in concentrations we used to decontaminate. We demonstrate a significant relation between contaminated sinks and CPE acquisition of patients admitted in ICU rooms, indicating the importance of sinks as the environmental reservoir of the epidemic.

Conclusion: Our study demonstrates the importance of sink drains as environmental reservoirs in the dynamics of a CPE epidemic, and proves that simple and decontamination procedures can be the key in eradicating the problem. Acetic acid is cheap, widely available and effective.

## 241: Identifying fast acting, surface cleansing products for the removal of pathogenic *Candida auris*

**Humphreys P<sup>1</sup>**, Allen C<sup>1</sup>, Rout S<sup>1</sup>, Humphreys P<sup>1</sup>

<sup>1</sup>University Of Huddersfield

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Following its first identification in 2009 from the ear canal of a Japanese hospital patient, *Candida auris* has become a growing concern worldwide as a result of its resistance to common antifungal drugs such as fluconazole. Mortality rates of *C. auris* related Candidiasis are high as a result of infections occurring in the highly vulnerable, such as those in intensive care. As a result, one of the major risk factors within the hospital setting is that of transfer to, and persistence on surfaces as a result of skin colonisation and shedding. Having an effective biocidal treatment for surfaces is therefore an important consideration. In the present study the ability of PHMB, benzalkonium chloride (BZK), DDAC and a commercially available biocide formulation (Clinell Universal) were assessed for their ability to sanitise high loadings (>10<sup>6</sup>CFU/cm<sup>2</sup>) of *C. auris* from the surface of 304 grade stainless steel, using BSEN 13697:2015 as a standardised testing method. Four I strains were selected, representing the three clades most common to the U.K. and the type strain. The results indicated that the commercial product was capable of generating the >4 Log (99.99%) reduction stipulated by the testing against all four yeast strains within 5 minutes. The results obtained from the remaining compounds indicated the DDAC and BZK were only capable of a >4 Log reductions against *C. auris* NCPF 8984, indicating strain to strain variation in biocidal susceptibility. In general PHMB on its own was the least effective compound against all strains investigated. The research funded by Gama Healthcare Ltd.

## **280: Evaluation of the cleaning efficacy of disposable and re-useable microfibre cloths under simulated cleaning conditions against MRSA and *Clostridium difficile* spores.**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Effective hospital cleaning is crucial to prevent transmission of nosocomial infections.

We assessed the cleaning efficacy of pristine, laundered, single-use microfibre cloths. Re-useable cloths may exhibit losses in cleaning efficacy following repeated laundry.

### Methods

The test surface was contaminated with approximately 10<sup>5</sup>cfu MRSA and 10<sup>6</sup>cfu *Clostridium difficile* spores re-suspended in 0.3% bovine serum albumin (moderate soiling).

Swatches of the cleaning cloth were pre-treated with Peracetic acid (PAA) disinfectant or sterile deionised water (DW).

The soiled surface was wiped with the test material, then the cleaned area was swabbed. Swabs were immersed in neutraliser solution and homogenised by vortex. Aliquots were plated onto blood or Braziers agar and incubated for 48hours under the appropriate conditions.

Five replicates were prepared. Surfaces were swabbed before cleaning to determine the number of organism dispensed onto the surface.

### Results

Regardless of the cloth type, PAA eradicated MRSA contamination below the detection limit (<4 cfu).

In the absence of disinfectant (DW only) MRSA persisted after wiping the surface with all cleaning materials. The median log<sub>10</sub>cfu and interquartile range (IQR) of remaining MRSA after wiping surfaces with disposable cloth; new re-usable and laundered microfibre cloth was 3.08 (2.97-3.18); 2.38 (1.60-2.56) (p<0.05) and 3.06 (3-3.20) respectively.

PAA was not able to eradicate *C. difficile* contamination. Significantly more spores remained on the surfaces after wiping with disposable cloth [median log<sub>10</sub>cfu 3.91 (IQR 3.82-4.03)] compared to wiping with laundered cloths [median log<sub>10</sub>cfu 2.90 (IQR 2.78-2.90)].

### Conclusion

Disinfection efficacy may depend more upon biocide application and cleaning technique than cloth-type.

## 44: Outbreak of multi-resistant *Pseudomonas aeruginosa* urinary tract infections due to a contaminated and defective ureteroscope.

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<sup>1</sup>Doncaster And Bassetlaw Teaching Hospital Nhs Foundation Trust

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Situation: Patient IK presented to A&E with haematuria and generalised unwell on the 30/07/17 post ureteroscopy on the 27/07/17. Patient HW presented unwell to A&E on the 31/07/17, post ureteroscopy on the 27/07/17, and patient MM re-admitted on 01/08/17 unwell with loin pain, post stent insertion on 26/07/17. All three patients had urine samples taken on admission growing *Pseudomonas aeruginosa* sensitive only to Colistin, the recurring multi-resistant *Pseudomonas* flagged up by the IPC team.

Background: The index patient DA from Romania presented with urosepsis associated with *Pseudomonas aeruginosa* sensitive to Colistin only, had ureteroscopy and stone removal in July 22nd 2017. He spiked temperature post procedure and commenced on intravenous Colistin.

Assessment: A total 25 patients from theatre list were investigated following an outbreak review meeting, a flexible ureteroscope (Fx2) was identified as common link, this was decommissioned as referred for analysis and reported showed extensive damage of scope –broken pixel in fibre optic image bundle, multiple points of angulation, and chemical damages. Despite these, the scope passed the leak test each time during sterilization using Sterilox procedure. Sterile rinse water flushes through the decontaminated scope yielded one colony of the *Pseudomonas aeruginosa*. Reference lab confirmed same VNTR profile from for all the isolates.

Review: Replacement of the Fx2 ureteroscope, investing in new scopes and single use scopes, track serial numbers of scopes returned to manufacturer, review decontamination SOP, extensive IPC environmental sampling, surveillance and tagging, pre- and post-surgery urine samples, and carrying out duty of Candour to affected patients.

## 65: Perceptions and efficacy of an electronic reminder system for reducing urinary catheter use.

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** Prolonged urinary catheterisation is the main risk factor for catheter-associated urinary tract infection (CAUTIs). Urinary catheter reminders appear to reduce the rate of CAUTIs. The study examined the efficacy and nurse perceptions of an electronic reminder system, in reducing urinary catheter use.

**Methods:** A stepped-wedge randomised controlled design, conducted over 24 weeks in one hospital, followed by a survey and focus groups of nursing staff were undertaken. The intervention was the use of the CATH TAG, an electronic tag placed on the catheter bag, which prompted a review of ongoing catheterisation. Primary outcomes were mean catheter duration and nurses perceptions about ease of use. A thematic coding approach was used to evaluate nurse perceptions. Duration of catheterisation was assessed using a Cox proportional hazards regression model.

**Results:** There were 595 participants in the control phase, 572 in the intervention. The duration of catheterisation was slightly lower in patients where the CATH TAG was used (mean 5.1 vs 5.5 days, HR 1.02 95% CI: 0.91, 1.14, p=0.75). Excluding the patients transferred between wards, there was a 22% reduction in mean catheterisation duration IRR 0.78 (p=0.15). 83% (n=52) experienced no barriers or problems in using the device. Themes from the focus group included identifying the benefit of a reminder device and improvements to integrate into patient care.

**Conclusion:** The introduction of an electronic catheter reminder timer was well received by nursing staff. To allow for practice change to embed and potentially further influence catheter duration, a longer study may be warranted.

## 99: The use of platelet bags surfaces to determine the effect of biological surface conditioning on the retention of bacteria

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<sup>1</sup>Manchester Metropolitan University

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Bacterial contamination of blood products poses a major risk in transfusion medicine. To reduce the interactions between the bacteria and the surface, surface analysis and microbial assays were carried out in the presence of a human plasma conditioning film (CF) using *Staphylococcus epidermidis* and *Serratia marcescens*. Three bag surfaces of different roughness's were used (rough 3549.8 nm, smooth 1021.2 nm, flattened 108.1 nm). Optical surface profiling demonstrated a reduction in surface roughness on the rough surface. Scanning Electron Microscopy demonstrated that when human plasma was combined with *S. marcescens* there was an increase in retained bacteria. Surface chemistry changes were determined via Attenuated Total Reflection-Fourier Transform Infrared Spectroscopy, in which the CF appeared to mask parts of the spectra relating to the plasticiser. The physicochemistry demonstrated significant changes in Gibbs Free energy and base-energy, with an increase on all three surface types. Both bacteria, when tested using the Microbial Adhesion to Hydrocarbons assay, demonstrated a reduction in adhesion with only *S. epidermidis*' adhesion to ethyl acetate demonstrating a significant increase. This work demonstrated that the addition of a human plasma conditioning film altered the surface properties of the platelet bags (physicochemistry, chemistry, topography) and bacterial physicochemistry. Further, both bacterial sp. were retained in different numbers in the presence of a CF. It is hoped that this work will enhance the understanding of how surface properties and organic condition of the surfaces influence the development of microbial biofilms in platelet concentrate bags to devise a solution to discourage biofilm formation.

## 106: Biodegradable polymer drug delivery technology to prevent implanted medical device infection

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<sup>1</sup>University Of Strathclyde

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Infection of in-dwelling medical devices, predominantly caused by Staphylococcus species, can be particularly problematic when pathogenesis involves formation of a biofilm. Consequences of an infection can be severe, often requiring device removal due to the difficulties in delivering a dose of antimicrobial high enough to eradicate a biofilm at the site of infection - this is complicated further if the device in question is not designed to be easily removed. There is currently much focus on the development of methods for prevention of device-related infections, and biodegradable polymer drug delivery technology has great potential for this application.

In this study, the polymer PLGA (Poly(D,L-lactic-co-glycolic acid(65:35)) has been formulated with the broad spectrum antibiotic rifampicin, at ratios 50:50 and 60:40 PLGA:rifampicin, and the *in vitro* drug release and antimicrobial activity analysed. The formulations were coated on glass coverslips and stored in PBS at 37°C; 120rpm. Over a period of 4 weeks both formulations steadily released the majority of their drug load (>94%), and were able to produce large zones of inhibition against *S. aureus* (>34mm) in a disk diffusion test. Furthermore, both formulations successfully inhibited *in vitro* biofilm formation when compared to PLGA alone with a 5 log reduction in CFU/ml (99.999%).

The results of this study indicate that biodegradable polymers could potentially be used for delivering a high local dose of antimicrobial at device implant sites, and may therefore represent a promising method for infection prevention.

## **158: Investigating antibacterial skin washes to reduce *Staphylococcus aureus* infections associated with peripheral cannulae: a feasibility study**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Potentially infective complications of peripheral cannula use occur with an incidence of 7-13/1000 line days in the literature. However, rates of cannula site infection are unknown in Sheffield Teaching Hospitals (STH). Routine bathing of patients with topical disinfectants is associated with a significant reduction in catheter-related bloodstream infections in critical care but limited data exist for peripheral cannulae on general medical wards.

To provide an evidence base for use of antibacterial skin washes to reduce cannula site infections in this general setting, we firstly attempted to collect local baseline cannula related infection rates. The proposed data should be routinely collected by ward staff but in practice this is not consistently done so a research nurse was employed. As prospective patient-level data required collecting, informed consent was required. Significant barriers to recruitment were encountered i.e. of the 272 line-days included, no cannula site infections were noted, highlighting the limitations of conducting research within a busy NHS setting. The second part of the study assessed acceptability and tolerability of three skin washes/wipes to staff and patients on 6 medical wards. After one-month, anonymous questionnaires were administered. Overall, patients preferred Clinell wipes or Stellisept washes, whilst staff preferred using Stellisept or Octenisan washes for patients. As Stellisept was noted to not dry the skin by both groups, Stellisept would be the recommendation if washes were to be introduced on medical wards at STHFT. Cost-effectiveness analysis is underway to determine the feasibility of introducing such products to reduce trust-attributable *S. aureus* bacteraemias at STH.

## **189: Risk on bacterial contamination of duodenoscopes and linear echoendoscopes is not age or wear and tear dependent: outcomes of two Dutch prevalence studies**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction:

A rising number of infectious outbreaks of MDRO caused by contaminated duodenoscopes, used for ERCP procedures, have been reported. Linear echoendoscopes (LEs), used for EUS procedures, have a similar complex contamination-prone design. It is unclear if wear and tear increases the risk on contamination.

### Methods:

In 2015-2017 two cross-sectional studies were conducted to determine the prevalence of contamination of duodenoscopes and linear echoendoscopes (DLE) in the Netherlands. Local staff used centrally distributed kits to sample according a uniform method type dependent 4-6 sites per DLE, and provided the DLE's age and number of procedures (NOP). Contamination definitions were AM20: any microorganism with  $\geq 20$ CFU/20mL, and MGO: any presence of microorganisms with gastrointestinal or oral origin.

### Results:

In total 69/75 (92%) ERCP/EUS centres responded with 1831 samples of 365 DLE (308 duodenoscopes and 57 LEs). Of all duodenoscopes (mean age 4.7 years, IQR 2.4-6.6; mean NOP 231, IQR 103-448), 52 (17%) were AM20 and 45 (15%) MGO contaminated. Of all LEs (mean age 3.7 years, IQR 1.8-6.0; mean NOP 318, IQR 138-455), 8 (14%) were AM20 and 9 (16%) MGO contaminated. For both definitions contamination was not age or NOP dependent (P-values >0.63).

### Conclusion:

Over 15% of all DLE were contaminated with digestive tract bacteria and both age and wear and tear were not associated with DLE contamination. These results suggest that not only worn but also brand new DLE are prone to contamination. Preventive measures and new DLE designs are required to minimize the risk of exogenous transmission.

## **206: Needle-stick injury: Prevalence and knowledge among Mansoura University medical, dental, and veterinary students.**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Needle-stick injuries (NSIs) are a health hazard for transmitting blood borne diseases among health-care workers. However, medical students among others tend to use needles often. So this study was conducted to measure the prevalence and evaluate the knowledge regarding NSIs in practicing university students.

A cross sectional study was conducted from December 2016 to March 2017 on 753 students in Mansoura university faculty of medicine, dentistry, and veterinary adopting a multistage, stratified, cluster sampling technique using a structured questionnaire by an infection control specialist. The questionnaire included six questions on proper needle disposal techniques, answering a minimum of four questions correctly shows sufficient knowledge.

The study results revealed that 382 (50.7%) students experienced NSIs in the past year alone, 11% of which filed an incident report and only 6% received secondary prophylaxis. 56.5% of the injuries were caused during re-capping, 30.4% during injection, and 13.1% during disposal. Dental Students were 1.7 times (95%CI 1.1-2.7, and P=0.007) more liable to NSIs than others. On top of that 58.7% of the students did not receive full course of Hepatitis B vaccine, 48% of which experienced NSIs. Furthermore, 83.3% of the students claimed receiving education on proper needle disposal techniques, however, only 15.9% showed sufficient knowledge.

In conclusion, It is evident from the review of this study that there is a significantly high prevalence and low rate of reporting of NSIs among students, and poor knowledge on proper needle disposal techniques. This suggests the need of comprehensive educational programs on NSIs for university students.

## 268: Duodenoscopy-associated transmission of Carbapenem-resistant *Pseudomonas aeruginosa*

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Aim

We report a duodenoscopy-associated transmission of metallo- $\beta$ -lactamase-producing *P. aeruginosa* expressing VIM carbapenemase (VIM-PA).

### Methods

Two VIM-PA identifications occurred in the same month in our university hospital. Epidemiological investigations, microbiological analyses and molecular typing were performed. The ability to clean and disinfect the duodenoscope was evaluated. Expertise of duodenoscope was performed by the French health authority.

### Result

Index case was a patient with a known VIM-PA rectal colonization who had undergone an endoscopic retrograde cholangiopancreatography (ERCP) with Olympus TJF-Q180V at day0 (D0). After usual cleaning, duodenoscope was used at D1 for 3 patients, at D2 for 1 patient and at D4 for 1 patient. The second patient of D1 developed a septic shock with VIM-PA and Ceftazidim-resistant PA identified on peritoneal and blood cultures 3 days after ERCP. Use of duodenoscope involved was immediately stopped.

Rectal colonization with VIM-PA was identified only for the first patient of D1. The only link between the 3 patients was realization of endoscopy. No virus transmission (Human Immunodeficiency Virus, Hepatitis C virus, Hepatitis B virus) was identified for the 6 patients. No deviation on duodenoscope's cleaning and disinfection was identified. Expertise of the duodenoscope revealed Ceftazidim-resistant PA (sample at D6 after ERCP for the index case). Molecular typing revealed strict identity of each PA strains. Abnormalities of the distal cap were disclosed.

### Conclusion

A design change to the instrument is necessary. Strict adherence to endoscope's reprocessability and regular microbiological analyses are essential prevention measures.

## **271: *Staphylococcus aureus* bacteraemia associated with furosemide infusion for the treatment of decompensated heart failure**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The annual UK incidence of *Staphylococcus aureus* bacteraemia (SAB) is static and new approaches are needed to bring about reduction. We describe a novel association between SAB and treatment of decompensated heart failure with furosemide infusion.

Eleven episodes of hospital-acquired SAB were noted, occurring over ten months across two cardiology wards on separate hospital sites. The baseline annual mean had been 3.5 episodes. All episodes occurred between three and fourteen days into admission for the management of decompensated heart failure. All patients had received furosemide infusions, with six receiving continuous infusions. Only seven had evidence of peripheral venous cannula (PVC) site infection. The use of continuous furosemide infusions had increased threefold over three years, but no SABs had occurred among patients receiving continuous furosemide infusion in previous years. The rise in furosemide infusion use was due to a more aggressive approach in treating decompensated heart failure, but also a consequence of an earlier organisational change limiting the dose of furosemide administered by bolus.

We hypothesised that the increasing burden of infusions precipitated suboptimal practice around care of PVCs and infusions. Audits showed compliance with PVC insertion/maintenance documentation of around 80%. A quarter of staff were unaware of the correct skin preparation for PVC insertion and 11% were unaware of the correct means of decontaminating a needle free device. A range of educational interventions concerning care of PVC and infusions was made by the infection prevention and control team, following which only one further case occurred over the next eight months.

## 196: Optimising heart valve culture

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Infective endocarditis is a serious and potentially fatal disease. Identifying the causative organism is key to choosing antibiotic treatment and duration. Patients undergo valve replacement/repair when antibiotic treatment alone is insufficient. Antibiotic therapy depends on whether the causative organism has been grown from the excised valve especially in blood culture negative infective endocarditis cases. The nationally recommended conventional heart valve culture method uses microscopy and enrichment broth cultures to increase yield of fastidious bacteria. We reviewed our laboratory practices of culturing heart valves.

**Methods and results:** We undertook a retrospective audit to review all heart valves cultured, over a period of 4 years, using the conventional method. We checked whether culture results correlated with the clinical history and, where requested, molecular broad range polymerase chain reaction targeting bacteria (16S PCR). 220 valves were received of which 56 (25.4%) were positive for bacterial culture. Of these 56, 33 (58.9%) were considered to be contaminants. Of the contaminants, 30 were isolated from the broth enrichment sub-cultures (91%). 16S PCR proved invaluable in determining whether the bacteria isolated was likely a contaminant. Only one true culture positive result from the enrichment cultures (*Propionibacterium* spp) was identified as significant.

**Conclusion:** Our study shows that enrichment broths suffer a high contamination rate attributed during processing. These discrepant results can cause unnecessary confusion. We propose stopping the use of enrichment broths and implement molecular 16S PCR method to improve the diagnostic outcomes. Our study findings will positively impact both patient management and laboratory processing.

## 212: The evaluation of the rapid polymyxin NP test for the detection of colistin resistance among *Enterobacteriaceae*

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: Susceptibility testing of colistin is challenging as broth dilution is not feasible for most diagnostic laboratories. The study was aimed to evaluate the performance of rapid polymyxin NP test (RPNPT) for detection of colistin resistance.

Material/methods: All clinically significant *Enterobacteriaceae* isolates were tested for colistin susceptibility using broth macrodilution (BMD) method. Broth dilution was considered as reference method. All Isolates with MIC of >2 µg/ml (BMD) and 100 isolates with MIC ≤ 2 µg/ml were subjected to an in-house RPNPT, disc diffusion, gradient test (Liofilchem, Italy). Colistin susceptible and resistant isolates were identified by examining the change of color in the wells (bacterial growth in the presence of colistin changes the original orange color to yellow). Additionally, all isolates were investigated for the presence of *mcr-1* gene.

Results: A total 49/ 872 *Enterobacteriaceae* isolates were resistant by BMD method. The RPNPT gave negative result for the colistin susceptible isolates and positive results were obtained for all 49 resistant isolates. Among the 49 isolates, MIC with gradient test method was low and the categorical agreement between the gradient test method and BMD was 14.3%. Disc diffusion was unreliable. PCR for *mcr-1* gene was negative.

Conclusions: Turnaround time for RPNT is approximately 4-hour compared to overnight incubation using MBD and diffusion test. Hence RPNPT is a suitable alternative to BMD for detecting colistin resistance. The discrepancies obtained by gradient test method were high –this method should not be used for the determination of colistin susceptibility

## **213: Broad-range 16s rRNA sequencing : an additional diagnostic test from sterile sites**

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background : Broad-range 16s rRNA sequencing is being increasingly used to identify pathogens from a range of culture negative sterile specimens. This is a study to evaluate the additional value of 16s PCR on sterile samples especially which are culture negative.

Method : All the reference laboratory reports from October 2016 to September 2017 were retrospectively studied. This study was done in University Hospitals Coventry and Warwickshire. It was a quality improvement study to look for the total number of specimens sent and the positive results from the reference lab. They were analysed and compared with the culture result.

Result : A total of 59 samples from 48 patients were sent for sequencing by 16S PCR. PCR was positive in 11 (11/48) patients, whereas culture was positive in 9 (9/48) patients. Five of the specimens had same organisms in culture as well as PCR method. Five samples (10%) which were culture negative were positive by PCR which could have been missed without PCR.

Discussion: 16S PCR is an additional test to culture and can be beneficial in the patient management of deep seated infection. The sensitivity of the results can be further improved by selecting the appropriate specimen for sequencing. The probability of detecting the organisms may increase by sending more than one specimens for sequencing.

## **223: Review of trends and performance in UK NEQAS Microbiology's General Bacteriology Scheme: April 2014 to March 2018**

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<sup>1</sup>UK NEQAS Microbiology

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Introduction:** For the UK NEQAS for Microbiology General Bacteriology scheme, twelve distributions are prepared and dispatched each year to UK and non-UK laboratories. Each month three simulated clinical specimens are prepared and distributed to participants, who examine the specimens in their laboratories and report their findings. Positive specimens contain well characterised organisms and correspond to those likely to be found in clinical practice. Negative samples are also included. Occasionally, more challenging specimens are distributed for educational purposes, or where recognition of an unusual pathogen may be of importance.

**Methods:** Reports were reviewed for the period April 2014 to March 2018 (144 specimens) in order to observe trends in methodology used and to identify areas of difficulty experienced by participants.

**Results:** During this period the maximum participation each year was 589 to 612 laboratories. The most common methods of specimen identification were conventional (23/36) and MALDI-TOF (11/36) in 2014-15 and MALDI-TOF (29/36) and conventional (4/36) in 2017-18. Poor performance occurred for 13 specimens (9%), where a consensus of 80% participants with intended result was not achieved. These included advanced (4) and educational (2) specimens. The most common reasons for poor performance were failure to isolate the pathogen in the specimen (9), and misidentification of organisms with particular methodologies (3).

**Conclusions:** During this time laboratories have invested in new technologies. The change from conventional to MALDI-TOF methodology was most noticeable for the non-enteric specimens. Review of performance over time is useful to identify areas where participants have had difficulties with the distributions.

## 246: Advanced prevention and utilization of foodborne disease using the rapid inspection vehicle (MFDS Mobile Lab) in Korea

Seung Wan L<sup>1</sup>

<sup>1</sup>Ministry Of Food And Drug Safety

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

The MFDS has been producing and operating rapid inspection vehicle since 2012. There are 3 main objective of the rapid inspection vehicle, the first is the preliminary inspection of foods such as the Olympic Games and the World Cup to prevent foodborne disease. The second is the rapid identification and analysis of the foodborne disease occurrence site. The third is used to promote the public to prevent foodborne disease. Total 5 vehicles are produced and placed in the headquarters and some regional office of food and drug safety to systematically respond to the situation in the field. The vehicle is divided into a conference room and a laboratory space by changing the structure of a general large bus. The laboratory consists of gene analyzer, gene extractor, clean-bench, and preprocessing devices, and it is possible to check the contamination of food poisoning bacteria through gene analysis in food. We have constructed a system that enables simultaneous analysis of 17 bacteria such as pathogenic *Escherichia coli*, *Salmonella* spp. within 4 hours. The rapid inspection consists of sample preprocessing, gene extractor, gene amplification, and result analysis. The 2018 Pyeongchang Winter Olympic Games and Paralympic Games were placed in the athletes' village and inspected the food ingredients of the participating athletes for foodborne disease. If some bacteria are inspected by pre-cooking inspection of food ingredients (Total of 748 inspections and detection of 5 cases), the ingredients were discarded. A successful Olympic Game was held with foodborne disease prevention actives using a rapid inspection vehicle.

## **250: Diagnostic stewardship implementation and impact of Filmarray Meningitis/ Encephalitis (FA-ME) panel in a tertiary care setting in Karachi, Pakistan**

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Introduction: Filmarray Meningitis-Encephalitis® (FA-ME) provides rapid, reliable Community-Acquired Meningitis/Encephalitis (CA-ME) diagnosis, maximizing early, pathogen-directed clinical decision support and stewardship goals. We implemented FA-ME diagnostic stewardship (DS) in a tertiary care hospital in Karachi, Pakistan and report on process activities and antimicrobial de-escalation impact. Methods: FA-ME was implemented in May 2017 for CA-ME patients admitted to Aga Khan University Hospital. Strategies were implemented in pre-analytic (exclusion of nosocomial and shunt meningitis), analytic (backup culture, wet mounts and Xpert MTB/RIF®), and post-analytic (clinical correlation to reduce false positives, antimicrobial advice) phases to improve reliability and stewardship outcomes. Antimicrobial de-escalation at 24 hours was determined for FA-ME negative, and enterovirus positive patients. Results: From May 2017 to July 2018, FA-ME was requested on 600 patients. Pre-analytic assessment led to deferral of 6 (1%) tests. Mean laboratory turnaround time was 3.6+3.6 hours (95% CI 3.379-3.908). Backup microbiological cultures, wet mounts, and Xpert yielded additional diagnoses in 1.2% (n=7), 0.7% (n=4) and 1.3% (n=8) patients respectively. Two HSV-2 false-positives and 1 Cryptococcus false-negative test were identified, re-tested, and corrected on post-analytic assessment. Antimicrobials were de-escalated in 63.2% (12/19) patients with enterovirus meningitis, and in 51% (n=218) adults and 53.8% (n=40) children <18 years (infants excluded) with negative FA-ME results. Conclusions: Diagnostic utility of FA-ME was improved through application of DS strategies. Although we did not perform a before-after study to evaluate percent reduction in antimicrobial use, antimicrobials were discontinued in 50-60% of patients with results warranting de-escalation. Physician education can further increase compliance with de-escalation.

## **270: No better than picking results out the blue - Clinical diagnosis of flu**

**Keane C<sup>1</sup>**, Bal A<sup>1</sup>, Currie S<sup>1</sup>

<sup>1</sup>*NHS Ayrshire & Arran*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Between January and May 2017, on-site influenza PCR testing was carried out in the Combined Assessment Unit at University Hospital Crosshouse, using the Cepheid GeneXpert platform. Out of 209 patients tested, 63 were positive for influenza.

Clinicians completed a form with each request for on-site influenza testing, which included the following information: clinical suspicion of influenza (scale from 1 to 10), symptoms present, and whether droplet precautions were in place pre-test. Length of hospital stay data was collected retrospectively.

No correlation was demonstrated between clinical suspicion score and influenza result. In fact, where clinicians recorded the highest score (10), all patients tested negative for influenza.

Fever, cough, sore throat and runny nose were slightly more prevalent in influenza positive patients, but differences between influenza positive and negative patients were not significant. Furthermore, no constellation of symptoms demonstrated a clinically useful sensitivity and specificity, either for influenza presence or influenza absence.

An additional significant finding was that where influenza positive patients had no droplet precautions in place pre-test, the majority (90.6%) of these patients had a cough which would create a risk of droplet transmission. Influenza positive patients were shown to have a significantly reduced length of hospital stay. Findings from this pilot suggest that it is not possible to diagnose influenza clinically. Provision of a rapid and reliable laboratory test is therefore essential, and will additionally assist with safer and more efficient use of single rooms, and reduce the risk of influenza transmission to patients, visitors, and health care workers.

## 274: Evaluation of the QIAGEN Qiastat-Dx® system for the detection of pathogenic gastrointestinal bacteria

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

88 prospective fresh (n=68) and retrospective frozen (n=20) stool samples on FecalSwab were assayed for bacterial detection using the QIAGEN Qiastat-Dx® RUO Gastro-Intestinal test panel, a syndromic nucleic acid amplification test (NAAT) system. We compared it to a combination of culture for *Salmonella*, *Shigella* and *Campylobacter* and the NAAT detection of *Clostridium difficile* (Xpert *C. difficile* BT).

Toxinogenic *C. difficile* was detected in 15 samples by both systems and in two more by the Qiastat-Dx® system.

Other bacteria were detected in ten cases: *Salmonella* and *Shigella* were respectively grown from two and three samples with an average time to identification of 2.5 days. NAAT detection was also positive with results available under 70 minutes. In contrast, *Campylobacter* sp. was detected by NAAT in 3 samples and never detected by culture. Pathogenic *E. coli* was detected in five cases by NAAT (stx1/stx2: n=2; EAEC: n=1; EPEC: n=2).

Bacterial co-infections were diagnosed only by QIastat-Dx in four cases.

The hands-on time of the Qiastat-Dx® system is very limited (under three minutes per sample) with a turn-around time of 67-69 minutes.

The analytical performance of the QIAGEN Qiastat-Dx® system matches that of the GeneXpert system for the detection of *Clostridium difficile*, and allows the rapid detection of *Salmonella* and *Shigella*. It outperforms culture for *Campylobacter* sp. and allows the additional detection of the major enteropathogenic. The CE-IVD system will allow the additional detection of the major viral and parasitic pathogens for the comprehensive documentation of infectious diarrhea cases.

## **276: Near-patient testing for Influenza: the Infection prevention and control perspective**

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

High levels of influenza activity observed in the UK during the 2017-2018 season was mirrored locally on the Wirral. Despite investment in molecular testing in the local Microbiology laboratory, its off-site location resulted in delayed turnaround times of the results. Consequently, Infection prevention and control(IPC) measures were compromised. A trial of a near-patient testing using the Xpert<sup>®</sup> Xpress Flu/RSV was carried out in the Acute Medical Unit(AMU) to assess its utility and compare with data from previous influenza season.

Methods: Nose/throat swabs from patients were tested by the AMU clinicians on the Xpert<sup>®</sup> Xpress Flu/RSV in the period between 20.11.17 and 02.01.18.

Results: 101 samples were tested. The average time taken from decision to test the patient to availability of results was 2.75 hours compared to 12 hours in the previous season. Turnaround of results was reduced from an average of 3.25 hours to 51 minutes. 31% of patients were positive for either Influenza A/B. Discharge was expedited within 4 hours of patient arrival in 47% of positive patients.

Discussion:

The use of near-patient testing was found to be advantageous as evidenced by the judicious use of antivirals, avoidance of unnecessary admissions and timely implementation of IPC measures. It also expedited decisions regarding discharges facilitating bed management. However, there were still some instances of delays of up to 6 hours in isolating known positive patients. In order to optimise the benefits of near-patient testing, existing isolation /cohorting facilities should complement the benefits of rapid availability of results.

## **279: Isolation bed days reduced by implementation of centralized rapid diagnostics for influenza virus**

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

The yearly influenza epidemic is a logistic challenge in hospitals with insufficient possibilities to isolate patients in single rooms. To reduce isolation bed days, we aimed at reducing time from sampling to availability of test results of influenza without compromising quality of test results.

### Materials/methods:

From January 2nd to May 31st 2018, departments at the 1000 bed University Hospital situated in Odense and Svendborg had the possibility to request a rapid PCR test for influenza. Swabs from upper airways were analysed for influenza A and B virus on Cobas Liat instruments (Roche) at the Department of Clinical Microbiology (Odense) or at the Department of Clinical Biochemistry (Svendborg).

The instruments were operated by specifically trained laboratory technicians, and verification and external quality assessment followed current laboratory standards. All instruments were connected to the laboratory information system of the Department of Clinical Microbiology, thereby automatically transferring results to patient records and to national surveillance.

### Results:

The analysis achieved accreditation by DS/EN ISO 15189 in both laboratories. 2,968 of 4,086 patients had a negative result in the influenza rapid test. Average time from sampling to the report was available in the patient record was 2.5 hours compared to 33.8 hours for the conventional influenza diagnostics. Isolation bed days were thus potentially reduced by 31.3 hours for 2,968 patients, corresponding to 92,898 hours or 3,871 days in total.

### Conclusions:

By implementing rapid diagnostics for influenza virus in hospital laboratories, quality of results can be ensured, and isolation bed days markedly reduced.

## **7: Importance of knowledge assessment before the educational intervention on occupational health and safety of percutaneous injuries (PI) for healthcare workers in Jeddah, Saudi Arabia**

**Nafouri N<sup>1</sup>**, Farahat F, Al Zahrani A, Bakulka K  
<sup>1</sup>*King Abdulaziz Medical City*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** This study is an analysis of occupational health and safety knowledge on percutaneous Injuries (PI) before an educational intervention for healthcare workers attending professional symposia in infection control from different healthcare facilities.

**Methods:** Knowledge of participants who attended training during the period from Dec 2015 to May 2016 was assessed using a pre-designed questionnaire. The questionnaire included 5 questions on the importance of occupational safety history, identification of risk and hazard of personal and engineering control measures.

**Results:** Total number of participants who attended the training was 662. The response rate was 57.4%. Among respondents, only 9.7% scored 80% or above (the passing mark), quarter (24.7%) scored 60% and more than half (57.9%) scored less than 60%. Only 7.6% scored zero. Median knowledge score was 40%. The lowest percentage of correct answers (8.4%) was related to identification of difference between hazard and risk followed by the best safety device where the answer should be a careful worker. About 50% correct answers were reported on the questions of the importance of occupational safety history and examples of engineering control (50.8% each). The highest correct answers were on barriers to purchasing products for safety to prevent PIs (73.7%).

**Conclusion:** Knowledge assessment before educational interventions is essential to focus on the healthcare providers' need before the course and hence reduce effectively the burden of exposure to hazards within healthcare facilities. Healthcare workers should be given time to attend such activities. The focus of training should be on hazard identification and control measures.

## 36: Aseptic practice for peripheral cannulation - overcoming human factors

**Bennett G<sup>1</sup>**, Cooper D<sup>2</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background.** Aseptic practice has been widely introduced for cannulation, however, not all processes are instinctively fully followed. Here we monitored cannulation practice using a basic dressing pack (synergyhealth) and after the implementation of a peripheral cannulation procedure pack (B Braun) and associated training to see if the right product and the right training improved aseptic practice.

**Methods.** Cannulation practice was observed in 2 areas in the trust. Tailored training was devised based on initial observations and provided during the implementation of the peripheral cannulation procedure pack containing: cannula, general aseptic field, skin cleaning, gauze, waste bag, underarm drape, traceability label, dressing, tourniquet and prefilled saline syringe. The audit was repeated 6 months later.

**Results.** The peripheral cannulation procedure pack increased compliance with use of: general aseptic field (+43%), aseptically filled syringe (+150%), under arm drape (+45%) and disposable tourniquet (+10%). The specific and tailored implementation training had a positive impact on human factors involved in the cannulation process. There was an increase in: hand washing before procedure (+6%) and after procedure (+38%), use of a disposable drape (+93%) and mean skin cleaning time increased (+66%).

**Conclusion.** Introduction of a full cannulation procedure pack, increased use of all items within the pack and improved aseptic practice, compared with using a basic dressing pack. The tailored training improved behaviours previously inhibiting best practice (human factors) 6 months after the implementation, demonstrating that a mix of specific training and the right product help overcome human factors and compliance with aseptic practice.

## 54: Hand hygiene compliance in primary care wards in Northern Ostrobothnia Hospital District in Finland (years 2004-2005 and 2017)

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

Hand hygiene (HH) is one of the most important interventions to prevent healthcare-associated infections (HAI). Previous studies show that easy availability of alcohol-based handrub (ABHR) adds compliance. Still little is known about HH compliance in primary care wards (PCWs).

### Aims

To compare the availability and use of ABHR in 2004-2006 and 2017 in PCWs of Northern Ostrobothnia Hospital District in Finland.

### Methods

Infection control team performed a survey in 2004-2006 (survey I) and 2017 (survey II). Studies were performed during one day using data collection forms. Head of PCWs filled a pre-questionnaire before the actual visits.

### Results

45 PCWs (the number of beds 10-52, median 29) (I) and 33 PCWs (the number of beds 15-44, median 25) (II) were surveyed. 40% (I) and 12% (II) of wards had no ABHRs at the end of beds. Yearly ABHR consumption was registered in 80% (I) and 82% (II) of wards. 58% of wards gave feedback on HH to personnel in 2017.

The mean consumption of ABHR was 24 ml/patient/day (I) and 28 ml/patient/day (II),  $p=0.07$ . The head of PCWs reported that HH was instructed to 78% (I) and 79% (II) of new employees. Based on observation, HH was instructed to 61% of new employees in 2017.

### Conclusions

Although availability of ABHR has improved, the consumption remained low. This can be explained by the fact that personnel was rarely instructed and given feedback. Only availability of ABHR is not enough but guidance is also essential.

## **92: Psychological interventions using behavioral planning cognitions to increase compliance with hand hygiene recommendations in healthcare professionals: a systematic mini-review**

**Wienert J<sup>1</sup>**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

Theory-driven psychological interventions can help to increase compliance with hand hygiene in healthcare professionals with the overall aim to reduce nosocomial infections and sustain patient safety. Planning cognitions as a behaviour change technique targeted by interventions can help to increase and maintain compliance.

### Aim

To identify studies that tested the effectiveness of psychological interventions that make use of planning cognitions to increase and maintain compliance with hand hygiene in healthcare professionals.

### Methods

The electronic database PubMed was systematically searched to identify studies. Studies published in English language between 2008 and 2018 were eligible for identification.

### Findings

Fifteen studies were identified of which two were included for further analyses. One study was a stepped wedge cluster RCT conducted in UK, providing educational training for ward coordinators by coupling feedback to personalised action planning. The other study was a cluster RCT conducted in Germany, providing educational training on planning among other behaviour change techniques for physicians and nurses and feedback discussions for clinical managers and head nurses. The quality of both studies varied between moderate to good. Both studies indicated effects in favour of psychological interventions.

### Conclusion

Findings suggest positive effects in favour of theory-driven psychological interventions that make use of planning cognitions. However, the concrete impact of planning cognitions and potential psychological working mechanisms remain unclear. More RCT studies are required to further support the current state of evidence.

PROSPERO-ID: CRD42018096906

## 153: Educating infection control link nurses, target on hand hygiene

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Helsinki University hospital (HUS) started a campaign in 2016 to improve hand hygiene compliance. As part of the campaign, we create an educational program for infection control link nurses to audit hand hygiene. Infection control link nurses who have got basic education on infection control and prevention were accepted to the education. The participation also required their superior's approval.

The educational program (7h 45min) was divided into four sections: 1) Hand hygiene and Five Moments' model, 2) Observation as method, 3) Giving feedback and 4) Repetition. Every section includes a practise of Five moments' model and the programme which is used for auditing. Between education times, link nurses continue practise in their units. After the theory and practise, the link nurses do first audit with an infection control nurse.

The link nurses considered the training programme good and experienced it was strengthening their role as an infection control link nurse. Some of the superior have noticed vocational growth in the link nurses during education.

Our main goal is to teach the proper hand hygiene concretely by the work. Link nurses are well known in their units and they are easy to approach. It makes it easier to maintain hand hygiene in discussion on daily bases. Our educational program has just started and the first results of auditing are soon available. Already it is clear that it had made a good impact of hand hygiene and infection control and prevention in our hospital.

## **160: Branding infection control link nurse in Finnish ICU - educating yourself to educate others.**

**Sanoja J<sup>1</sup>**

<sup>1</sup>*HUS Helsinki University Hospital*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Three years ago, infection control link nurse was not yet so known title in the intensive care unit. Varying amount of staff members took the influenza vaccine, and we we're having protocols for preventing respirator associated pneumonia. Use of alcohol-based hand rub could have been more efficient. For our high risk patients we in cardiac surgical intensive care unit wanted to improve, be better and more organized on this.

Branding the role of infection control link nurse started by first getting educated with Infection Prevention Pass –training provided by Joint Authority of the Helsinki and Uusimaa Hospital District. Annual plan was made with clear goals to increase the use of alcohol-based hand rub, get better participation on influenza vaccination and increase awareness of isolation protocols made our job description more clear. Close teamwork with infection control nurse and infectious disease specialist doctor have been the road to success.

Now both nurses and other staff members approach infection control link nurse for consultation, and valued member of multi professional decision making, regarding to making our patient care even safer and higher on its quality. We arrange non-stop training for all our staff members in the cardiac surgical intensive care unit to increase hand hygiene, and to improve patient safety. Influenza vaccine coverage among our staff is now over 90%, and use of alcohol-based hand rub has increased from being 533 liters in 2016, up to 829 liters in 2017 and expecting even higher numbers for this year.

## **167: Patient education on transmission based precautions: a context assessment in a university hospital, São Paulo, Brazil**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Introduction: patient education can minimize adverse events related transmission based precautions (TBP). Nevertheless, the best approach depends on context-related factors.

Objective: identify barrier and facilitators to implement a guide to support patient education on TBP.

Methods: qualitative research performed through non-participant observation in two inpatient wards of a university hospital, aiming a preliminary assessment of the context. A trained researcher carried out 20 hours observation in various nursing shifts, focusing the interaction of healthcare workers (HCW) and patients. We used the consolidated framework for implementation research (CFIR) to analyze data on the dimensions "inner-setting" and "individuals". Further, data emerging from the observation analysis were sub-categorized as "environment", "process" (inner setting) and "characteristics", and "behavior" (individuals).

Results: Inner-setting: "environment" showed to provide good structure to support prevention measures. There several spaces for HCW interactions and also for patient, visitors and carers. Patients allocated in TBP rooms are frequent. "Process" overall showed to have systematic standards that favors preventive measures and the likelihood for acceptance of innovative approaches. The current process disfavor the effective communication among individuals. Individuals: "characteristics" of individuals interacting in the environment are highly diverse, including nurses, physicians, physiotherapists, pharmacist, auxiliary nurses, patients, visitors, carers, policemen, infection control, housekeeping, and training personnel. "Behaviors" showed partial adoption of preventive measures, insufficient effective communication among individuals, and lack of both systematic planning of patient education and of behavioral alerts in cases of disruption of preventive measures. Conclusion: promoting effective communication is essential to implement patient education on TBP in this context.

## **179: Analysis of impact of various hand hygiene campaigns in a tertiary care hospital in north India: Are we on the right track?**

**Biswal M<sup>1</sup>**, Rajpoot S<sup>1</sup>, Kaur R<sup>1</sup>, Kaur K<sup>1</sup>, Kaur H<sup>1</sup>, Kaur H<sup>1</sup>, Sharma M<sup>1</sup>, Dhaliwal N<sup>1</sup>, Angrup A<sup>1</sup>

<sup>1</sup>*Postgraduate Institute of Medical Education And Research*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Hand hygiene (HH) improvement has been a focus of infection control activities in our 2000-bedded tertiary care hospital in north India. We regularly conduct extensive activities including annual hand hygiene campaigns and year-round theoretical and practical training to healthcare workers (HCWs). The present study was undertaken to determine the impact of these of these activities on the HH compliance in the hospital over the previous four and half years.

**Method:** Using the World Health Organisation (WHO) standardised observation method, four infection control nurses trained in observation and recording of HH activities, conducted this audit.

**Results and discussion:** A total of 41478 hand hygiene opportunities were observed from January 2014 to June 2018. HH compliance increased from 32.8% to 42.7% overall, from 41.7% to 58.1% in intensive care units (ICUs), 3.8% to 32.4% in emergency units and 9% to 22% in general wards. Compliance in all HCWs improved significantly (doctors: 26.4 to 32.5%, nurses: 37% to 48.6%, auxillary personnel: 24.5% to 33.2%) and in patients' family members from 34.5% to 50.2% ( $p < 0.01$ ) as did compliance in each of the five moments of WHO ( $p < 0.01$ ). A distinct difference was observed between HCWs in adult versus paediatric units and between medical and surgical units.

**Conclusion:** This study is the longest period of HH compliance monitoring in any Indian hospital with the maximum opportunities observed. HH compliance has improved over the years in our hospital with repeated campaigns. The study also indicates potential areas for future efforts at further improvement in HH compliance.

## **193: The 'Gloves are off' – can we reduce inappropriate glove usage through an educational based intervention and risk assessment**

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<sup>1</sup>*Great Ormond Street Hospital For Children*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

Non-sterile examination gloves are required to protect healthcare workers against blood and bodily fluids. Audits completed at Great Ormond Street Hospital (GOSH) demonstrated that the overuse of non-sterile gloves was a key reason for lack of adherence with the 5 moments of hand hygiene. Gloves were also being worn for the preparation of all intravenous medications.

### Methods:

A team within GOSH worked together to create an educational awareness programme for staff. This included an updated educational package as to when gloves should be worn in general practice as well as providing a risk assessment strategy for when to use gloves for preparing IV medication.

Data has been collected for hand hygiene audits, infection rates, soap and hand sanitiser usage, glove usage, dermatitis levels in staff, qualitative data from patients and families surrounding glove usage and financial and environmental measurements at baseline and is ongoing.

### Results:

Early results show a substantial reduction in glove usage since the introduction of the programme. We will continue to measure our data and present the findings of the key measures within the presentation.

### Conclusions:

Glove usage is often inappropriate and leads to hand hygiene not being performed which increases the risk of healthcare associated infection occurring. In addition, overuse of gloves for tasks such as routine preparation of IV medication means that healthcare staff are at increased risk of occupational dermatitis. We believe that through evidence based education and supporting risk assessment staff can be more informed about when they need to wear gloves.

## 202: Fairy Hands and the Apprentice. Educating in hand washing at Cartoonia Hospital

Cozzi L<sup>1</sup>, Rossi F<sup>2</sup>, Scippa F<sup>3</sup>, **Auxilia F<sup>4</sup>**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Since three years a national contest has been promoted among students from different Italian Universities in order to increase the compliance with hand washing policy and spread the culture of hospital hygiene at the beginning of the professional career. Students can choose whatever medium they prefer so that a remarkable number of posters and videos have been realized so far. The use of a cartoon released in English was preferred to make the message clear in a young and friendly framework particularly suitable for students and residents which represent the main target of this product. It can be also suitable for disseminating through social networks as happened for other topics. It consists of 5 parts answering the classical five questions Who, What, Why, When, Where. (i) Who: two main characters described as follows: << Fairy Hand was an excellent health worker. The Apprentice was untrained, but very clever. While practicing the same procedures the Apprentice noticed that Fairy Hand had always obtained better results. So he decided to ask him his secret... >>. (ii) What: Fairy Hands present his friends: Hydro-alcohol Gentleman, Watery, Soapy and Drying Man all represented in a peculiar fashion. (iii) Why: << The importance of being a superhero...>> Fairy Hands as superhero introduces the epidemiological motivation for hand hygiene. (iv) When: the 5 moments and, finally, (v) Where: an imaginary debate between the two main characters highlights the other topics to be figured out as the use of gloves and hand cream.

## 208: Inter-observer reliability of the fluorescent method

Sari V<sup>2</sup>, Lehotsky A<sup>3</sup>, Bansaghi S<sup>1</sup>, Haidegger T<sup>4</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Hand hygiene is the most efficient ways to prevent the transmission of infections, provided that the entire hand surface covered by the handrub. To monitor hand hygiene technique, the fluorescent method is commonly applied. Areas of hand treated with proper amount of fluorescent handrub glow under UV-light, where untreated regions remain dark. Evaluation usually performed by professionals. The aim of this study was to evaluate inter-observer reliability; how similarly professionals rate the same performance. Hand of volunteer participants were partially disinfected and examined using four different equipment (Stery-Hand, Derma Lite-Check Box, Schülke Optics UV and Semmelweis Scanner), images were recorded. Pictures were provided to four infection control professionals, who were asked to mark the not properly disinfected areas. From these evaluations, percent of "missed" hand surfaces were calculated. Eight hands were assessed with four equipment (32 pictures). All of these pictures were handled to every professional, altogether 128 evaluated pictures were analyzed. Images from the same hands were evaluated quite differently. Size of the missed area differed  $33.76 \pm 5.16$  percentage point (average  $\pm$  standard deviation) between the lowest and highest evaluation. The average Q1-Q3 interval were  $13.85 \pm 2.79$  percentage points. Based on our study, the fluorescent method not seems quite objective. The UV marker generates a color gradient on hands and it not obvious at all, what is the color intensity that represents enough handrub to disinfect the hand surface. Observers seem to judge it quite differently. Automatic evaluation of the fluorescent method can be a solution to eliminate inter-observer variability.

## 228: Interventions to enhance the teaching status of parasitology

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Recent surveys have highlighted an erosion of the teaching of parasitology in medical/veterinary schools across Europe and other developed countries, despite reports of increasing instances of food and water borne parasitic infections in these regions. To facilitate the teaching of this subject, essential to develop future health care professionals, we are performing different interventions at De Montfort University (DMU, UK). Briefly, these include: a) curriculum modifications to increase the time dedicated to the study of parasitology; and b) implementation of web-based resources in the curricula for enhancing teaching (e.g. through introduction of blended learning) and to encourage self-learning and participation among the students. Thus, DMU is leading the development of an on-line package for teaching and learning parasitology named DMU e-Parasitology in collaboration with different European academics and clinicians. This package has four sections: a theoretical section with mini e-learning modules to study major human parasitic diseases; virtual laboratory describing major techniques used in parasitology; a microscopy section with resources to enhance the study of parasites; a section with virtual clinical case studies to encourage self-learning. To assess the effectiveness of DMU e-Parasitology as a learning resource, we have done preliminary testing with final year BSc Biomedical Science students at DMU (n=194; 2017/18). 94.5% of students highlighted they gained appropriate knowledge of the pathology, prevention and treatment of some parasitic diseases; 93.1% indicated that they learnt basic skills to investigate parasitic disease. The interventions/resources described could be used to improve the teaching status of parasitology in human health degrees.

## **229: Let livestock MRSA stay in the barn – a Danish e-learning programme on veterinary infection prevention**

Holt J<sup>1</sup>, Urth T<sup>1</sup>, Christensen B<sup>1</sup>, Andersen A<sup>1</sup>, Bar Ilan M<sup>1</sup>

<sup>1</sup>*Statens Serum Institut*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

Denmark hold 5.7 million citizens and over 30 million pigs. in 2015 88 % of all slaughter pigs were colonized with LA-MRSA CC398 .39% of all MRSA-types in humans are LA-MRSA CC398. In 2014, the Minister of Health and the Food Minister appointed a MRSA Expert Group to renew the risk assessment of LA-MRSA CC 398. Based on the expert group's recommendations a compulsory hygiene course was initiated.

### Method

A pre investigation in 2016-17 visiting pig farms and study of existing teaching material, suggested that veterinary hygiene is a field well known to pig farmers regarding the methods of not bringing microorganisms into the barn (SPF).

### Design

The goal of future training is to change behavior in relation not to bring LA-MRSA out of the barn. Thus a web based (e-learning) linear program accessible at digital devices connected to the internet is created with a manuscript written on basis of results from the pre investigation. The program contains case stories representing the work area of pig farmers, drivers and butchers at the black end. The user's reflection on present behavior and knowledge is challenged with gaming, tests, illustrations, videos and graphs,. The programme is presented in Danish and English. Personal login assures a personal certificate.

### Results/conclusion

From December 2017 to end of April 2018 almost 10,000 workers have completed the 90 minutes programme. Feedback has been positive on content – but lack of computer skills and internet connection problems have required some assistance from the telephone helpdesk at NCIC.

## 231: A comparison between qualitative and quantitative fit testing

Dolloway M<sup>1</sup>

<sup>1</sup>Tsi

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Aims

Fit testing of tight fitting respirators in healthcare is a key component of any respiratory protection programme, protecting staff from airborne hazards. In the UK, fit testing is mandatory under the HSE 282/28 legislation. There are two basic types of fit tests: Quantitative Fit Testing (QNFT) and Qualitative Fit Testing (QLFT). The aim of the poster is to show why respirator fit testing is important and why QNFT is the most secure method.

### Methods

QLFT is a low cost, subjective pass/fail test that exposes the respirator wearer to a chemical stimulant (while donning a test hood) that can only be detected if the respirator leaks. There are several ways this test can be performed incorrectly, the results are subjective and there are often recordkeeping challenges. QNFT measures the number of particles naturally occurring in the atmosphere compared with the number that get inside the subject wearers mask. The ratio of these measurements gives you a numerical fit factor. It is a non-subjective test, as it does not rely on the test subject's voluntary or involuntary response to the challenge agent.

### Results / Conclusions

Studies show that respirator wearers who undergo respirator fit testing achieve far greater protection than those who have not (NIOSH, 2007). Any fit test method significantly improves respirator protection but QNFT is particularly beneficial. Fit testing with the PortaCount<sup>®</sup> Respirator Fit Tester is the only method which is HSE compliant for all respirators including disposable respirators and eliminates the guesswork associated with Qualitative Fit Test methods.

## **248: Impact of reduced laboratory contact time on medical student understanding of bacteriology procedures**

**Walker J<sup>1</sup>**

<sup>1</sup>*NHSs Grampian*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

A strong understanding of essential elements of microbiology and infectious disease is vital for all doctors in developing necessary skills and knowledge to manage infection. Limited laboratory contact time for basic identification processes in current medical teaching curricula can lead students to struggle with understanding the technical aspects of microbiology investigation. An audit of medical student knowledge of Gram staining CSF was completed in April 2018 using 3rd year exam answers to directly test student understanding.

### Methods

Sixty year three Aberdeen University medical student exam papers were analysed for answers about CSF investigation for diagnosis of infective meningitis. Candidate responses of gram staining for presence of bacteria were identified alongside protein and glucose levels and white cell count.

### Results

In response to naming a rapid bacteriological CSF investigation fifty nine out of sixty candidates did not provide the answer 'Gram stain CSF for bacteria'.

### Discussion

Laboratory time is increasingly cut from medical curricula, and students are required to learn key laboratory investigations from written sources. The audit demonstrates the direct effect of this process – a lack of familiarity and appreciation of basic investigation. It signals junior doctors will struggle in understanding what to expect from laboratory investigation and subsequently manage infection less effectively as a result. Numerous advances in multimedia allow teaching of practical procedures cheaply and effectively. In an era of reduced laboratory teaching time the challenge is to recognise the problem and be creative in providing the means to teach fundamental procedures of bacteriology more effectively.

## **253: Education to promote best practices and behaviours in infection prevention: the potential of the MOOC**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

The demands on health and care services have led to a rethink in ways staff access continuing professional development and education. In infection prevention, access to education and training is imperative to ensure staff have the right knowledge to promote best practices and behaviours. Online courses are becoming increasingly popular for learning and knowledge acquisition, are generally considered easy to access and are flexible for individuals to fit around work and life. However, to have a positive impact on hearts and minds, a particular approach may be required which ensures that individuals have opportunities to reflect on practice, whilst also feeling they are part of a community of learners.

We report on the design and delivery of a bespoke MOOC (Massive Open Online Course) in infection prevention. We offer reflections based on our experiences regarding what works to ensure online courses provide individuals with the right knowledge to make a difference in their own infection prevention practice.

The poster details the MOOC set-up and provides an overview of a series of bite-size learning units focused on, for example, infection prevalence, antimicrobial use, leadership, and the role of the champion. Different tools and techniques are used to check unit learning outcomes are met and provide motivation to progress and complete the course.

Pedagogical implications are drawn including course timespan, and “teacher” visibility (Bayne & Ross, 2014). We report on using best practice guidance for online teaching such as monitoring course progress and creating a learning community (Miller, 2015).

## 35: Reduction in environmental microbial surface counts following treatment with activated ionized hydrogen peroxide

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<sup>1</sup>Changi General Hospital

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The aim of this study was to evaluate the microbial reduction achievable by standard terminal cleaning followed by surface unit disinfection by activated ionized hydrogen peroxide (AiHP).

### Methods

Test sites included single rooms in the intensive care units (ICU) and single rooms and/or bed areas located in multi-bedded wards. A standard set of surfaces were sampled using a Dacron swab immediately following standard terminal or discharge cleaning. Following AiHP disinfection, the same sites were then re-sampled. Swabs were eluted into 1 ml of sterile saline, 100 µl aliquots of a 1:10 and 1:100 dilutions of the eluent plated onto trypticase soy agar and total colony counts (TCC) performed following 48 hours incubation. For a subset of samples, 100 µl aliquots were also plated onto methicillin-resistant *Staphylococcus aureus* (MRSA) selective agar.

### Results

Nineteen patient locations were sampled, giving 76 paired samples for analysis. Room/toilet door handles and patient bedside lockers showed the highest mean TCC after standard terminal cleaning. Following AiHP treatment, there was a statistically significant reduction in microbial counts ( $p < 0.05$ ). There was an average reduction of TCC by 85% for all sampled sites post AiHP treatment (range 40%-100% reduction). MRSA was not recovered from the tested surfaces.

### Conclusion & Discussion

There was large variation in TCC from sampled surfaces following standard cleaning processes. Disinfection with AiHP showed significant reductions in TCC. Further studies would be required to demonstrate if reductions in TCC would translate to reduction in acquisition of resistant organisms.

## 38: Biofilm formation on conventional and alternative materials used in automatic taps.

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<sup>1</sup>Quadram Institute, <sup>2</sup>Public Health England

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: *Pseudomonas aeruginosa*-contaminated water has been associated with serious infection. The contamination of hospital tap water can be caused by biofilm formation on plumbing components, including solenoid valves (SV) in automatic taps. EPDM rubber (used to make SV diaphragms) is reported to support *P. aeruginosa* biofilm and its use in healthcare plumbing is under question.

Aim: To investigate *P. aeruginosa* biofilm on EPDM and alternative rubbers used in SVs.

Methods: *P. aeruginosa* biofilm formation on material coupons (silicone-, nitrile-, EPDM-rubber) was investigated using a CDC Bioreactor. Coupons were suspended in the test medium (filtered tap water inoculated with *P. aeruginosa*) for three days before being removed, rinsed and agitated with glass beads in thiosulphate Ringer's solution. The resulting suspension was cultured.

SVs incorporating these materials were installed within an experimental water distribution system (EWDS). Tap assemblies were artificially inoculated with *P. aeruginosa* and flushed twice daily. Water contamination levels were monitored over 12 weeks by culture after which time, SVs were removed and analysed by culture and microscopy.

Results: The median number of *P. aeruginosa* colonies recovered from EPDM coupons ( $2.9 \times 10^5$  CFU/coupon; n=17) was significantly lower than from both nitrile ( $6.2 \times 10^5$  CFU/coupon) and silicone coupons ( $5.4 \times 10^5$  CFU/coupon). Within the EWDS, diaphragm material had no significant effect upon biofilm formation, or contamination of the tap water..

Conclusion: Current plumbing alternatives to EPDM rubber did not reduce biofilm formation *in vitro* or prevent the colonisation of SVs *in situ*. Further studies investigating materials incorporating antimicrobial agents should be carried out.

## 94: The REACH cleaning bundle: sustained improvements in the thoroughness of cleaning

**Mitchell B**<sup>1</sup>, White N<sup>2</sup>, Hall L<sup>3</sup>, on behalf of the REACH study team

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** The Researching Effective Approaches to Cleaning in Hospitals (REACH) study, a multi-site, stepped-wedge, randomised trial of a multi-modal environmental cleaning bundle, was implemented in 11 Australian hospitals from 2016 to 2017.

**Methods:** The bundle involved recommendations on cleaning agents, cleaning frequency, cleaning techniques, environmental cleaning staff training, creating a hospital-wide commitment to improved cleaning, auditing and feedback. One outcome from the REACH study was the thoroughness of cleaning, determined by the proportion of frequent touch points (FTPs) deemed clean. At each hospital, a trained local site team followed a monthly schedule to audit nominated patient rooms and bathrooms in selected wards and the intensive care unit. Dots were applied to nominated FTPs, consistent with previous approaches. Following cleaning, the site team used an ultraviolet light torch to assess removal of the dot. Data from monthly cleaning audits were analysed using a binomial generalized linear mixed model with a logit link function on the proportion of FTPs cleaned before and after cleaning bundle implementation.

**Results:** During the study, 5134 control and 20,309 intervention FTPs were audited with 11% of available beds audited every quarter (range 6%–16%). The proportion of FTPs cleaned before and after the intervention increased from 55% (95% PI 53%–57%) to 76% (95% PI 75%–78%) for the bedroom and from 64% (95% PI 62%–66%) to 86% (95% PI 84%–87%) for the bathroom.

**Conclusion:** The implementation of the REACH bundle which incorporated audit and feedback, led to sustained improvements in thoroughness of cleaning.

## 96: Investigating the variability and dynamics of airborne bacteria in a hospital intensive care unit over a 24 hour period

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Current knowledge of the clinical microflora is limited, however it is currently estimated that 10-33% of nosocomial infections are transmitted via air. This study aims to assess the variability and dynamics of airborne contamination in a hospital setting, and contribute to an improved understanding of the airborne bioburden in clinical environments.

Environmental air monitoring, using a sieve-impactor air sampler, was conducted in an Intensive Care Unit, with 500L air samples collected every 15-min over 24-h periods (08:00-08:00h). Room activity was logged and bacterial contamination levels were recorded as CFU/m<sup>3</sup> of air. A cascade-impactor and aerosol spectrometer were also used to separate particles into size fractions correlating to human lung deposition.

A high degree of variability in airborne contamination was observed over the course of a 24-h period in the hospital ICU. Contamination counts ranged from 12-510 CFU/m<sup>3</sup> over 24-h in an isolation room occupied for 10 days by a patient with *C. difficile* infection. Levels were lowest during the night and in unoccupied rooms, with an average value of 20 CFU/m<sup>3</sup>. Peaks in airborne contamination showed a direct relation to an increase in room activity, such as bed changes and visiting times.

This study demonstrates the variation and degree of airborne contamination that can occur in an ICU over a 24-h period. Numerous factors contributed to increasing microbial air contamination and consideration should be given to potential improved infection control strategies and decontamination technologies to reduce airborne contamination, with the ultimate aim of reducing healthcare-associated infections from environmental sources.

## 103: A pilot study to compare the residual bactericidal activity between a quaternary ammonium compound disinfectant formulation extracted from an impregnated combined detergent/disinfectant wipe and a chlorine containing disinfectant

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition

### Introduction

Surface disinfectants may be used to reduce contamination levels but little is published on residual effects of common agents. We compared residual antimicrobial activities of a quaternary ammonium compound-containing (QAC) formulated disinfectant extracted from a combined detergent/disinfectant wipe and chlorine (750mg/L) against *Escherichia coli* (ATCC 25922) and *Staphylococcus aureus* (ATCC 6538).

### Method

Sterile stainless steel and plastic discs were inoculated with test organisms and blank, sterile discs used as controls. Antibacterial activities were evaluated by counting colony forming units after exposure to test disinfectants for five minutes followed by a neutralization stage. To test residual activity, discs with dried disinfectant were inoculated with bacteria at 1, 6 and 24 hours after the disinfectant had dried.

### Results

Both disinfectants were equally effective at initial challenge, however dried QAC achieved a >6-log reduction on standard test strains of *E. coli* and *S. aureus* for at least 24 hours on stainless steel and plastic discs. In contrast, chlorine had no residual activity.

### Conclusion/Discussion

Our study is one of the first to quantify residual activity of QAC disinfectants extracted from wipes dried onto hard surfaces. Assuming that disinfection is performed at least daily, residual activity may continue until the next episode depending upon what other factors, such as repeated touch, have on the surface. A formulated QAC-based disinfectant delivered from a wipe has potential to exhibit a minimum 24-hour residual effect on surfaces; potential spore contamination (where QAC compounds are ineffective) should also be considered.

## 128: Continuous real-time monitoring of biological airborne particles on a hospital ward and the effect of plasma air disinfection

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Conventional sampling methods for airborne organisms in hospitals are limited in sample time intervals (minutes to hours) and conventional culture requirements, restricting organism detection and only allowing retrospective analysis (days). This limits their usefulness in analysing air quality and risks of airborne transmission of infection. They provide limited data for standard setting and assessing the effect of interventions designed to increase air quality and decrease airborne infection risks. Direct continuous bioaerosol sampling is an established technology used to characterise ambient external air. Portable instruments such as the Wideband Integrated Bioaerosol Sensor (WIBS) combine laser particle size and shape detection with signals of biological origin (fluorescence from amino acids and NAD(P)H) characteristic of viable bioaerosols. This campaign used WIBS to characterise airborne biological particles in a 4-bedded hospital bay over four weeks spanning a control period followed by a two-week intervention with plasma air disinfection. Conventional impaction plates, settle plates and surface swabs were taken in parallel. No significant difference was detected between conventional culture counts before and during intervention. Continuous monitoring found regular diurnal fluorescent particle peaks, most of which coincided with nebuliser therapy and/or ward traffic. Both filtered WIBS data (excluding signatures of nebulised drug particles) and raw WIBS data showed a significant reduction in airborne fluorescent particles 0.8-12 µm in diameter ( $P < 0.05$ ), during operation of the plasma units. The clinical significance of this requires further study. WIBS continuous real-time monitoring of the hospital environment provided information on air quality which was not revealed by conventional culture-based sampling.

## 161: What is the **microbiome of the human home?**

**Dancer S<sup>1,2</sup>**, McNally L<sup>1</sup>, McLaren J<sup>1</sup>, McGill G<sup>3</sup>, Fletcher L<sup>4</sup>, Noakes C<sup>4</sup>, Sharpe T<sup>3</sup>

<sup>1</sup>NHS Lanarkshire, <sup>2</sup>Edinburgh Napier University, <sup>3</sup>Mackintosh School of Architecture, <sup>4</sup>University of Leeds

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We know little about the range and diversity of microorganisms in the indoor home. People spend a great deal of time at home, especially those at the extremes of age, and it is possible that the indoor microbiome could impact upon human health.

This project screened indoor bathroom handle; telephone; kettle handle; bedside table; top of door; TV remote; toilet handle; and window sill in 100 Lanarkshire houses using dipslides in order to quantify and identify cultivable aerobic bacteria and fungi. Potential human pathogens were identified and characterised. Most sites yielded coagulase-negative *staphylococci*, *Bacillus* spp., and *micrococci* along with additional microbes reflecting room function and touch frequency. Two or more sites were positive for *Staphylococcus aureus* and Gram-negative bacilli in 23% and 63% homes, respectively. Gram-negative bacteria included *Pantoea*, *Acinetobacter* and *Serratia* spp. and *Pseudomonads*. Coliforms (*Klebsiella* & *Enterobacter*) were recovered from less than 10% homes. Filamentous and yeast-like fungi were associated with heavy contamination on door top, window sill and bedside table. The least contaminated sites were toilet and bathroom door handles. None of the bacterial pathogens were multiply resistant to antibiotics. Each site revealed its own distinct microbiological character, in type and amount of cultivable microbes. Human pathogens were generally associated with frequently-touched sites (TV remote, kettle handle and telephone). Whole houses also demonstrated unique microbiological characteristics, with morphologically similar and identifiable microbes observed at multiple sites within the same home. Each home thus displayed its own unique microbiome but with similarities to other homes according to site.

## 175: A comparison of culture based methods for the detection of *Clostridium difficile* in the environment

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

*Clostridium difficile* infection is an important healthcare-associated infection. As it is a spore-forming bacterium, *Clostridium difficile* survives for prolonged periods in the environment and inadequate decontamination results in transmission and outbreaks. Environmental surveillance for *Clostridium difficile* is not routine and is largely initiated during outbreak investigations or as part of research. Detection of *Clostridium difficile* in the environment is challenging and there is no agreed standard by which to do it.

### Objective

To compare various culture-based methods to recover *C. difficile* spores *in vitro* and to trial in clinical areas.

### Methodology

The detection and enumeration of *Clostridium difficile* in the environment was carried out using a variety of methods previously described in the literature. A culture-based method using flocked swabs inoculated onto commercially available *Clostridium difficile* selective agar was used, as were *Clostridium difficile* selective agar contact plates.

### Results

Within a laboratory setting contact plates were superior at spore recovery from hospital materials (marmoleum, polyurethane mattress fabric, polypropylene and stainless steel) compared to flocked swabs. A log<sub>10</sub> reduction of 0.5 to 1.3 in spores recovered was observed across the surfaces using contact plates compared to 2.1 and 1.99 using flocked swabs. Recovery was lowest from marmoleum and greatest from stainless steel using both methods. In clinical areas the selectivity of the agar was not adequate to prevent the growth of non-*Clostridium difficile* organisms.

### Conclusion

More sensitive and specific methods to detect *Clostridium difficile* from the environment are needed. A molecular method of detection may be a possible alternative.

## **182: Cleaning the clinical surface environment: what is the reality?**

**Harbot S<sup>1</sup>**, Asadi F<sup>2</sup>, Dunn H<sup>2</sup>, Hartley J<sup>2</sup>, Ciric L<sup>1</sup>, Cloutman-Green E<sup>2</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

The clinical environment plays a role in the transmission of infection, with patients in intensive treatment units (ITU's) being most susceptible to healthcare associated infections. Studies have demonstrated many multi-drug resistant organisms are recoverable from clinical surfaces.

### Aim

To assess the distribution of microorganisms within ITU, in relation to surface cleaning practises undertaken by healthcare staff within a patient bed space.

### Methods

Tryptone Soya Agar contact plates were used to determine total viable counts on various surfaces. Surfaces were categorised by height as level 0 (<0.6m), level 1 (0.6m-1.2m) or level 3 (>1.2m).

Observations were undertaken for 500 hours to audit how non-organic surfaces were cleaned, the technique and cleaning agent used by healthcare staff within a patient bed space.

### Findings

The data showed that surfaces at level 1 were less contaminated. At level 0 CFU recovery ranged between 40-350, level 1 ranged 2-269 and at level 2 it ranged 5-350. 17% of staff entering bed spaces undertake some form of surface cleaning. On average, it was observed a cleaner will clean 8 surfaces of a possible 56 when entering a bed space; nurses 0.2 and doctors 0. The most frequently cleaned object within the bed space by nursing staff was the trolley surface, with 228 number of contacts.

### Conclusion

Cleaning methods were inconsistent between all staff groups. Confusion between cleaning roles was observed, showing a need for a clear division of cleaning responsibilities between healthcare staff groups.

## 191: Human-related microsporidia in the English urban environment: what we know so far?

**Hoosen H**<sup>1</sup>, Anjum U<sup>1</sup>, Izquierdo F<sup>2</sup>, Peña-Fernández A<sup>1</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The potential zoonotic transmission route of *Enterocytozoon bieneusi* and *Encephalitozoon* spp. (*E. intestinalis*, *E. hellem* and *E. cuniculi*) is under discussion. "Urban animals" could represent a risk to the population that should be carefully studied. Following the detection of human-related microsporidia in 2 /18 dog faecal samples collected in the city centre of Leicester (UK) in January 2016, 228 animal faecal samples were randomly sampled from different parks and recreational areas across Leicester from June 2016 to February 2017. The presence of microsporidia species were sought by real time polymerase chain reaction (RT-PCR) with melting curve analysis after extracting DNA using bead disruption of the spores using Fast-Prep for soil following previous methodologies. 28 stool samples were positive for human-pathogenic microsporidia, as follows: *Enterocytozoon bieneusi* was detected in 2 waterfowl stool samples. A higher prevalence of *Encephalitozoon* spp. was identified. Thus, 26 faecal samples (14 deer, 7 avian [3 waterfowl, 2 songbird, 1 pigeon, 1 uncertain], 2 dog, 1 fox and 2 unidentified due to diarrhoea) were positive for *Encephalitozoon* spp. Specifically, *E. intestinalis*/ *E. hellem* were detected in two samples from avian species (waterfowl and diarrhoeic sample) and *E. cuniculi* in 7 (6 deer ; 1 fox). Our results indicate the presence of human-related microsporidia in urban parks and recreational areas in Leicester, which could represent a risk for humans. Interventions to tackle this potential risk should be applicable to a variety of animals, although more studies are needed to fully understand the potential zoonotic role of these pathogens.

## **192: An *in vitro* study of the growth and survival of *Staphylococcus aureus* in a nutrient and moisture deficient environment**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The ability of microorganisms to attach to surfaces in the healthcare environment promotes infection transmission. The nature of the healthcare environment was deemed as antibiofilm due to fervent decontamination and desiccation associated with it until recent findings showed the existence of microbial biofilms on its surfaces. It was suggested that the humidity in the air provided enough moisture for some microorganisms to form biofilms. Biofilm formation and survival of *Staphylococcus aureus* NCTC 8178 were studied in microtiter plates following a series of hydration in 5% tryptic soy broth and dehydration for 12 days. Biofilm phenotype was determined by protein content, live/dead staining and confocal microscopy while survival was determined by live/dead staining. At 48 hours, the protein content was low with majority of the cells viable and the depth of the biofilm measuring its highest at 14.52  $\mu\text{m}$ . The protein content increased with age, peaking on day 12 while biofilm depth decreased from 10.37  $\mu\text{m}$  on day 4 to 9.48  $\mu\text{m}$  on day 12. The live /dead stain showed a small population of dead cells on the biofilm matrix on day 12. The cells were well attached to the microtiter plate with sparse thin layers of extracellular polymeric substances. *S. aureus* cells were found to maintain viability for 12 days under poor nutrition and semi-dry conditions. Understanding microbial survival on nutrient and moisture deficient surfaces will be useful in the prevention and removal of biofilm in healthcare settings and hence curb infection transmission.

## 194: Evaluation of the XenexGerm-Zapping Robots™ device (XenexGZR) in the control of environmental contamination in an Intensive Care Unit (ICU)

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Multidrug-resistant organisms (MDRO) thrive in the hospital environment; reducing these organisms reduces the risk of healthcare-associated infections (HAI).

Aim(s)/Objective(s): describe the experience of using XenexGZR as a support in the routine cleaning in an ICU of a tertiary hospital in Barcelona, and to assess the impact on the microbiological environment load.

Method(s): A prospective study was carried out in two-bedded ICU rooms on two floors, with cross-assignment and alternation for each floor for 8 months.

Environmental sampling was made weekly, including: air sampling (aerobic microorganisms and fungi) for each room (n=563), and surface sampling (bed rails, patient and nursing tables, and medical device push buttons) per patient (n=2183 from 814 beds).

For statistical analysis, samples were categorized into three groups: 0 (standard cleaning procedure (n = 456)); 1, with recent use (<7 days) of XenexGZR (n=171); 2, without use recent (> 7 days) of XenexGZR (n=187).

Results: For groups 0, 1 and 2, the mean of aerobic microorganisms was 133, 125 and 156 CFU/m<sup>3</sup> respectively. For groups 0, 1 and 2, number of MDRO isolates was 61, 10 and 13, respectively. Comparing results of group 1 vs 0 and 1 vs 0+2 showed a tendency to decrease microbiological air load (p=0.30 and p=0.74). Significant decrease was observed on MDRO isolates in both comparisons (p<0.00)

### Discussion/Conclusions:

The use of XenexGZR decreases the environmental microbiological load; smaller number of MDRO isolates was observed in the rooms with use of XenexGZR. These probably have an impact, reducing HAI incidence. Further studies are required.

## 200: *Cryptosporidium* spp. in the English urban environment: a public health concern?

**Anjum U**<sup>1</sup>, Magnet A<sup>2</sup>, Izquierdo F<sup>2</sup>, Peña-Fernández A<sup>1</sup>

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Several species of *Cryptosporidium* can infect humans and have been described as opportunistic parasites. Different outbreaks have been described in the UK as oocysts of these pathogens can spread through contaminated water and food as some species of *Cryptosporidium*, such as *C. parvum*, exhibit resistance to harsh environmental conditions. These pathogens have been found in animal faeces, thus we reported the presence of *Cryptosporidium* spp. in a dog faecal sample collected in a highly frequented public park in Leicester city centre (UK), after screening 9 topsoil and 18 faecal samples. As a result, and to determine potential risks to the Leicester population, we collected 132 animal faecal samples [37 deer, 13 dogs, 4 cats and 78 avian (27 uncertain due to diarrhoea, 25 pigeon, 14 waterfowl and 12 songbird)] across different parks in Leicester from June 2017 to May 2018. Animal faecal samples were appropriately screened using Kinyoun's acid-fast staining. We observed structures related to *Cryptosporidium* spp. in 16 faecal samples as follows: 10.3% avian (3 pigeon, 2 songbird and 3 diarrhoeic), 18.9% deer and 7.7% dog. However, and in order to characterise the risks to the local population, molecular analysis will be required to determine if the oocysts of *Cryptosporidium* spp. found are from anthroponotic species. Our results might highlight the relevance of performing environmental monitoring studies to determine the presence of these pathogens in the urban environment due to the unprecedented expansion of the urban media that is occurring to a global scale.

## **204: Influence of staff behaviour on air quality in a conventionally-ventilated operating theatre during a simulated arthroplasty: a case study at the University Hospital in Parma**

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Surgical staff behaviour in the operating theatre (OT) is one of the factors associated with the indoor air quality and the risk of surgical site infections. The aim of this research was to assess the influence of staff behaviour on air quality in a conventionally-ventilated OT during two simulated hip arthroplasties. During the first arthroplasty, the surgical team behaved correctly, in the second one the behavioural recommendations were not respected, in particular with regard to door openings, number of people, movements. Microbiological, particle and microclimatic analysis was carried out at three different sampling points. Bacterial contamination was evaluated by active (colony forming units per cubic metre, cfu/m<sup>3</sup>) and passive (Index of Microbial Air contamination, IMA) samplings. A spore trap sampler was used to identify both viable and non-viable fungal spores. Airborne particles with diameters of  $\geq 0.5 \mu\text{m}$  and  $\geq 5 \mu\text{m}$  were counted by a laser particle counter. Air velocity, air humidity, air temperature and CO<sub>2</sub> concentration were also monitored. The highest levels of microbial and particle  $\geq 0.5 \mu\text{m}$  contamination were recorded during surgical operation with the surgical team behaving "not correctly", up to 93 cfu/m<sup>3</sup>, 16 IMA, 82696/m<sup>3</sup>. Very low air microbial contamination was reached behaving correctly (13 cfu/m<sup>3</sup>, 2 IMA), similar to the threshold values recommended in unidirectional airflow OT (10 cfu/m<sup>3</sup>, 2 IMA). Microclimatic parameter values were affected by not correct behaviour. Adherence to behavioural recommendations in the OT is essential in order not to undermine the effectiveness of the heating, ventilation and air conditioning system.

## 214: A decade of prevalence surveys in a tertiary-care center - to assess the burden and trends of healthcare associated infections.

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Surveillance of healthcare-associated infections (HAIs) is an important component of comprehensive infection prevention and control programme. Point prevalence surveys (PPS) can provide baseline information regarding HAI. Repeated PPS have been used for the evaluation of infection control programmes and to monitor trends in HAI rates.

### Methods

Setting - 1531 bedded, tertiary care, government hospital with 8 ICUs and 41 wards (21 clinical departments). Annual point prevalence surveys on HAI were conducted from 2008 to 2017 to assess the point-prevalence rate of HAIs by reviewing cases and performing bedside surveys.

### Results

The hospital census for acute-care patients, as measured by the PPS, did not vary significantly over the period. Overall prevalence of HAI showed a decreasing trend. HAI rate varied between 0 and 10% in various departments except ICUs (44-62%) and burn unit (22-27%). HAI were significantly higher on the medical and surgical services than on other services ( $P < .001$ ). Wound infections (41-47%) were the most common HAI in all the years. An upward trend was seen for UTI (12 to 38 %) while a downward trend was observed for BSI (16 to 5 %). Gram-negative bacteria (*E. coli*, *Klebsiella* & *Acinetobacter*) were the most common pathogens. There was a significant increase in carbapenem and vancomycin resistance

### Conclusion

Despite the limitations of PPS, study yielded valuable data on the epidemiology of HAI. Repeated PPS are useful in following trends and rates of infection. Such methodologies can be valuable as they enable better annual planning of departmental strategies to meet hospital needs

## 216: Surface sampling in the clinical environment - Why, why and how?

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Hospital surfaces can pose a significant infection risk as they can act as a reservoir for nosocomial pathogens. In order to risk assess the organisms present on surfaces and to establish constituents of healthcare surface microbiome, environmental sampling is required. However, little guidance on how this should be done is available.

The aim of this study was to analyse different methods to suggest optimum choices for sampling different surfaces and pathogens within the clinical environment and identify factors to consider when designing an environmental monitoring protocol.

Literature was assessed using ScienceDirect, Web of Science and PubMed, and the following keywords were included: hospital, environment, sampling, surface, monitoring, contamination, swab, sponge, petrifilm, and contact plate. Outbreak and intervention studies were excluded as this review focused on the use of routine sampling only. Bacterial, viral and fungal contaminants were included.

The literature provided incomparable and contradictory results on the efficacy of different sampling methods and the isolation of different organisms. This made identifying a single overall sampling method impossible. However, some suggestions could be made, such as the use of sponges for recovering *C. difficile*.

Method choice should be selected depending on factors that cause variability in recoveries, such as surface state and topography, number of cells present, target organism, cell injury, adsorption to surface, resources available for results interpretation and the type of result required (quantitative or semi-quantitative). A need for further research with detailed analysis of sampling efficacies with a single method under different sampling conditions has been highlighted.

## 224: Improving the sampling algorithm for use with ATP sampling

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

The development of a reliable approach in the use of rapid Adenosine Triphosphate (ATP) testing, will be beneficial for assessing environmental hygiene within healthcare settings. A new sampling algorithm to assist in mitigating inherent variance, has been published but requires further simplification for regular use by infection Prevention practitioners. This study proposes a reliable sampling methodology for cleanliness monitoring that has applicability for a variety of branded ATP testing devices.

### Method

Monitoring and sampling for cleanliness monitoring has been conducted using the ATP sampling algorithm on a variety of surfaces. This includes healthcare surfaces, reusable medical devices, and food preparation surfaces and implements. The results have been analysed and applied to reconfigure the sampling algorithm to simplify the method. A better and functional risk managed approach to the results, can now be established using the ATP testing.

### Results

The results demonstrate the importance of a two-tiered cleanliness standard, used in combination with the cleaning intervention step (CIS) [ $p < 0.001$ ]. The CIS provides an immediate positive control and validation of the cleanability of the surface/device. A new two-tiered cleanliness guideline has been developed to assist with the use of a variety of branded ATP testing equipment.

### Discussion

The revised ATP sampling algorithm provides a real time, efficient and a more reliable assessment of the cleanliness of both environmental surfaces and reusable medical devices.

## 227: Presence of *Giardia* in urban parks from Leicester, UK

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

*Giardia duodenalis* is a worldwide leading diarrheagenic protozoan parasite. However, human giardiasis in the United Kingdom (UK) are underdiagnosed. The main aim of this study was to evaluate if *Giardia* is present in an English urban environment to determine if public health interventions were necessary to protect human health. Thus, 21 fresh animal faecal samples were collected from Humberstone Park in Leicester (UK) in August 2017, when there had been no precipitation. A veterinarian identified the possible animal species as: 7 avian (2 songbird, 1 pigeon, 4 uncertain) and 14 canine (dog). Smears were stained with Trichrome as described elsewhere. *Giardia* spp. cysts were observed in three faecal samples from dogs (21.4%), confirming our previous results in which we detected the presence of *G. duodenalis* in one dog faecal sample collected in the Leicester's Castle Park (central Leicester) in a pilot study performed in winter 2016 using the immunoassay ImmunoCard STAT!<sup>®</sup>. Our results, although preliminary, indicate the presence of *Giardia* spp. in Leicester's urban environment. Moreover, dogs could act as reservoirs and might play a potential role in the transmission of these pathogens in Leicester. Thus, public parks could be an important source of infection, particularly for children, as they can accidentally ingest this parasite from soil contaminated with dog faeces. This pilot study has provided critical insight for performing a more comprehensive study to determine the size of this risk and the necessity of enhancing public health awareness to reduce canine faecal pollution in Leicester to protect human health.

## 243: Application of continuous real-time monitoring to biological airborne particle source analysis in the operating theatre

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Conventional microbial sampling of air in operating theatres is usually carried out on commissioning after construction or structural modification. Cultures of settle plates or impaction air samples provide little information about the source of any contamination. Substandard operating theatre air quality usually relates to theatre practice or engineering faults whereas in-service monitoring of operating theatre air quality mainly relies on review of engineering parameters such as air-change rates and direct inspection of procedures. Limited data is available on the efficacy of continuous air particle monitoring with laser particle detectors. Portable instruments such as the Wideband Integrated Bioaerosol Sensor (WIBS) combine laser particle size and shape detection with signals indicating biological origin (fluorescence from amino acids and NAD(P)H) characteristic of viable bioaerosols. We present evidence of the utility of WIBS analysis in identifying sources of air contamination in operating theatres. In one example, unsatisfactory conventional culture counts (50 cfu/m<sup>3</sup>) were obtained from an operating theatre. WIBS detected regular spikes of spherical, fluorescent airborne particles of 0.5-2 microns over the operating table. These coincided with automatic flushing of sensor-operated taps in an insufficiently recessed scrub area. Another example concerns heater cooler units (HCU) in cardiothoracic surgery. WIBS analysis in operating theatres found no change in ambient airborne particles with operation of the Maquet HCU30, but a significant increase during operation of the Sorin 3T heater cooler device. WIBS thus provides a rapid method for detection of airborne particles in operating theatres facilitating source attribution and enabling appropriate response measures for source elimination.

## 244: Potential presence of *Cyclospora* and *Cystoisospora* in urban parks from Leicester, UK

**Peña-Fernández A<sup>1</sup>**, Anjum U<sup>1</sup>

<sup>1</sup>Leicester School of Allied Health Sciences, De Montfort University

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

*Cyclospora cayetanensis* and *Cystoisospora belli* (previously known as *Isospora belli*) are emerging coccidian parasites that can spread by ingesting contaminated food or water. Despite their presence is more common in tropical and subtropical regions, different studies have described domestic outbreaks due to these pathogens around the world. Zoonotic transmission of these pathogens is under discussion as they have been found in various animals and birds. We have performed a preliminary study to investigate their potential presence in an English urban environment. 132 animal faecal samples were collected between Summer 2017 and Spring 2018 from 7 different urban parks across Leicester (UK). A veterinarian confirmed animal species as: 78 avian (25 pigeon, 14 waterfowl, 12 songbird, 27 uncertain due to diarrhoea), 37 deer, 13 dogs and 4 cats. Smears were microscopically analysed by Kinyoun's acid-fast staining technique. *Cyclospora* spp. were observed in three faecal samples (2.3%), two from deer and one from avian (diarrheic sample); however, further analysis are required to determine if the oocysts observed are from *Cyclospora cayetanensis*. Contrarily, *Cystoisospora* spp. were not found in any of the screened stool samples. Despite our results should be considered as preliminary, the presence of *Cyclospora* spp. oocysts in 2.3% of the animal faecal samples collected across Leicester might represent a potential human risk that, although minor, should be thoroughly studied to protect the local community. Moreover, *Cyclospora* spp. have been found in different animal species, which may require different interventions to target those specific animals to protect the public health.

## 263: Systematic review of the relationship between air and surface microorganisms in hospital wards

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

The hospital environment including layout, environmental conditions, activities of people and surfaces is thought to play a significant role in the transmission pathway of microorganisms. Airborne microorganisms are a specific concern in some environments; as well as posing an inhalation risk bioaerosols can deposit on inanimate surfaces at some time and distance from being released by a source. However, the relationship between bioaerosols and HAI remains undisclosed, and there are very little quantitative data to assess interactions between air and surface contamination.

A systematic literature review was conducted to identify gaps in knowledge about the influence of the environment on the relationship between air and surface microorganisms in hospitals. We identified 127 papers that had conducted air sampling in ward environments. Of these papers, 77/127 studies performed surface sampling, 21/127 observed activities and 23/127 articles recorded physical parameters such as temperature and ventilation. Moreover, 57% of papers were published in the last 8 years, and the UK occupies 16% of selected papers and presents the highest percentage of countries.

Although many studies conducted air and surface sampling, the quantitative relationship between microorganisms in air and on surfaces over time is unclear. In addition, the effect of temperature, humidity, ventilation, size and layout of the room and human activities on survival rate and spatial deposition rate of bioaerosols over time is currently very limited. There is a clear need for research to investigate the influence of environmental parameters on deposition and survival of airborne microorganisms in controlled and real hospital environments.

## 272: Keeping it brief so there's no need to leaf: an Isolation Priority Scoring System on one page

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<sup>1</sup>NHS Ayrshire & Arran

Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

In May 2018, NHS Ayrshire & Arran's Infection Prevention and Control Team reviewed their Isolation Priority Scoring System.

Our acute hospitals, University Hospital Crosshouse (750 beds) and University Hospital Ayr (333 beds), have between them 146 siderooms, of which 130 are ensuite and only two are negative pressure. The variety of infections requiring isolation is becoming increasingly complex. A 'scoring' system for isolation priority helps make the best use of these limited resources. Our previous guidance was several pages long and did not clearly highlight situations where isolation would be essential. A more concise guideline was required. We based our updated scoring system on the Lewisham Isolation Priority System (LIPS). A score is derived by considering each of the following criteria: ACDP category (2, 3 or 4), route of transmission (contact, droplet, or airborne), evidence of transmission (nil, poor, moderate or strong), significant antimicrobial resistance (yes/no), high susceptibility of other patients with serious consequences (yes/no), prevalence (sporadic, endemic, or epidemic), and risk of dispersal (low, medium or high).

Once total scores were derived, this allowed us to list organisms/infections in order of priority. However, on completion of this process there remained some logical errors. These were adjusted manually post-scoring.

The final one page document now clarifies situations where isolation is mandatory (isolation score =10). Other organisms/infections are listed underneath, with a score of 1 to 9 (where 9 is highest). This document should simplify the task of prioritisation for single rooms, and highlights those organisms/infections for which isolation is mandatory.

## **281: Hospital sink drain traps – their microbiomes and role as a source of carbapenemase-producing members of the *Enterobacteriaceae***

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Poster Talk 2 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Recently several reports have linked hospital hand-washing sinks as a source of carbapenemase-producing *Enterobacteriaceae* (CPE), a group of bacteria frequently associated with soft tissue, urinary tract and blood-borne infections. However, the potential contribution of sink drain traps to the spread of resistance is not clear. The overall aim of our study was to investigate the diversity and CPE status of microbial populations found in UK hospital sink drain traps, and in the discharge water released from them, in order to assess their content and the potential for resistance gene transmission. Drain traps were obtained from drug treatment rooms and from 'domestic' areas of a UK hospital. The traps were fitted into our model sink system, which has automated water flushing designed to reproduce regular use, and samples of biofilm and discharge water were collected immediately, and after one month of installation. Using selective growth media, more than half the drain traps were found to harbour CPE organisms. The organisms were identified using MALDI-TOF and are currently being characterised for resistance gene content. Metagenetic analysis of the biofilm samples revealed these were dominated by Proteobacteria and Firmicutes. These findings will contribute to our understanding of how best to minimise the risk posed by contaminated sinks.

## **24: Pneumocystis pneumonia: 6 years of diagnostics experience and cases in 2 district general hospitals**

**Poole S**<sup>1</sup>, Saeed K<sup>1,2</sup>, Cortes N<sup>1,2</sup>, Kidd S<sup>1</sup>, Thomas C<sup>1</sup>

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Pneumocystis pneumonia (PCP) remains a challenging diagnosis to make with significant mortality attached and a wide spectrum of clinical presentations.

Literature suggests the 1,3 beta-D-Glucan assay represents a helpful tool in diagnosing PCP and other fungal infections. Quantitative PCR of PCP DNA has become a sensitive established cornerstone for isolating this difficult-to-grow organism but concerns remain about the over detection of benign colonising airway organisms.

In this poster I review 19 cases of Pneumocystis pneumonia that have occurred in the last 6 years at 2 district general hospitals in the UK including risk factors and outcomes.

I also review our local experience of the 1,3 beta-D-Glucan assay as a helpful diagnostic tool for suspected PCP and of quantitative Pneumocystis PCR in diagnosis of these infections.

We have found there to be a very strong association between mortality and underlying rheumatological conditions which is explored in the review/poster.

## 5: Incidence and risk factors of phlebitis in patients with peripheral parenteral nutrition administration

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<sup>1</sup>Asan Medical Center, <sup>2</sup>Ajou University

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Introductions:** Peripheral parenteral nutrition is one of the easiest ways to provide nutrition for patients who have difficulty with enteral nutrition. But, on the other hand it is attended with danger such as, phlebitis. The purpose of this study was to investigate incidence of phlebitis and its risk factors in patients with peripheral parenteral nutrition administration.

**Methods:** Prospective observational study was performed with 289 hospitalized adult patients with gastrointestinal diseases. The researchers evaluated peripheral venous catheter that administered peripheral parenteral nutrition until their removal and investigated the incidence of phlebitis using phlebitis scale of Infusion Nurses Society (2016). Logistic regression model was used to identify risk factors involved with occurrence of phlebitis. The statistical significance limits were set at  $p < 0.05$ .

**Results:** The incidence of phlebitis was 37.0% (107 cases). Among them, Grade I was 24.6% (71 cases), Grade II was 12.4% (36 cases) and Grade III and IV did not occur. Platelet count (OR 2.13, CI 1.07-4.26,  $p = .032$ ), nutrition infusion rate (OR 0.36, CI 0.16-0.79,  $p = .012$ ) and infusion period (OR 1.02, CI 1.00-1.03,  $p = .033$ ) had statistically significance with phlebitis occurrence.

**Conclusions:** Using peripheral parenteral nutrition must be carefully reconsidered for patients with risk factors of phlebitis. In using peripheral parenteral nutrition, adjusting infusion rate deserves to be considered with care. Moreover, in case of extension of peripheral parenteral nutrition therapy, medical team must regards using another way such as middle line or central line for nutrition therapy in a serious light.

### **39: Active tuberculosis in End Stage Renal Disease (ESRD)**

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<sup>1</sup>Barts Health NHS Trust

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** The incidence of active tuberculosis (TB) in patients receiving Renal Replacement Therapy (RRT) for End Stage Renal Disease (ESRD) is believed to be high. We sought to examine features and outcome of TB in our ESRD population.

**Methods:** A retrospective study of active TB cases diagnosed between 2007 and 2017 amongst patients on RRT at a London tertiary centre for renal medicine.

**Results:** 87 patients on RRT were treated for active TB over 10 years. The mean age of patients treated for active TB was 49 (range 18-77) years. 59 (68%) were from South Asia; 9 (10%) from Africa, 12 (14%) from Europe, 2 (2%) from South America, 5 (6%) not recorded. Mode of RRT at diagnosis of TB was: haemodialysis in 50 (57%), peritoneal dialysis in 14 (16%), renal transplant in 23(26%).

Diagnosis of TB was culture confirmed in 71 (82%), 34 of these with supportive histopathology. 16 (18%) had a clinical diagnosis. 35 patients (40%) had pulmonary disease, 52 (60%) extra-pulmonary.

Treatment regimens were tailored to individual circumstances. 21 patients (24%) had complications from treatment, most commonly pruritus [5 (6%)] and visual disturbance [4 (5%)].

73 patients (84%) completed treatment with no evidence of recurrence, 4 (5%) died during treatment, 2 (2%) had a recurrence after treatment, 1 (1%) is currently on treatment and 7 (8%) were lost-to-follow up.

**Conclusion:** A high index of suspicion must be maintained throughout RRT for development of active TB. Despite serious comorbidity, treatment completion and mortality in these patients appeared similar to English national average.

## 49: Early evaluation of a national urinary tract infection (UTI) improvement collaborative

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<sup>1</sup>NHS Improvement

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Gram-negative bloodstream infections (GNBSI) contribute significantly to mortality in the NHS.

In response to the O'Neill review of Antimicrobial Resistance (AMR) in May 2016, the Secretary of State for Health launched an ambition to halve healthcare-associated GNBSIs and inappropriate antimicrobial prescribing by 2021.

*Escherichia coli* BSI represent 55% of all GNBSI in England, and approximately 75% of *E. coli* BSIs occur prior to hospital admission. International prevalence studies identify the urinary tract as a significant source of healthcare associated infections, with the predominant causative organism *E.coli*.

A national programme has been developed to address healthcare-associated GNBSI. This includes a focus on reducing UTI in catheterised and non-catheterised individuals, both in and outside hospital.

The IHI Breakthrough Series Collaborative is an evidence-based change model to enable rapid testing of changes, to learn, adapt, scale up and spread improvement work and has been used extensively in UK health systems to deliver improvement in other areas of patient safety. A national UTI improvement collaborative of 29 healthcare systems started in May 2018 with a further cohort commencing in September 2018. Trusts bring together a team of at least 5 people from across acute and community settings with an aim of; reducing UTI by 5% in pilot areas, reducing indwelling urinary catheter usage by the same amount, and to develop core improvement skills in the participants.

This poster presentation will describe the development of collaborative learning using behavioural science, and will present results from the first collaborative and initial findings from the second.

## **66: The Japan-Infection Control Hospital Group (J-ICHG)'s activities and nursing homes design with considering infection preventions**

**Yamanoue H<sup>1</sup>**, Yura H<sup>2</sup>, Arai Y<sup>3</sup>, Sasaki T<sup>4</sup>, Yamasaki M<sup>5</sup>, Iuchi R<sup>6</sup>, Hatae S<sup>5</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Introduction:** The J-ICHG established in 1994, consists of the various occupations related medicines. Our activities are based on visiting hospitals and discussing measures in Japan and other countries in the EU. The measures have been introduced by publishing guides/manuals, giving lectures and conference presentations. This report shows a nursing homes which designed with considering infection preventions as a result of our activities.

**Hospital design in Japan:** Previously, non of hospitals were designed considering infection prevention. The National Center for Child and Development was the first building, designed considering infection prevention in Japan. Some J- ICHG's members participated in design the hospital. This design has been influenced many Japanese hospitals.

**Nursing Home Design:** A nursing home, Popolo-no-Mori was designed with considering infection prevention by J-ICHG's members in 2013. Five points of view were considered for infection prevention "Easy access to Hand Washing" "Easy for cleaning" "Dust free structure" "Ventilation" "Easy access to Personal Prospective Equipment" As basic knowledge of infection prevention for staff, some lectures were given before opening the nursing home. Popolo-no-Mori 2 was designed in 2017. Reviewing the first nursing homes design, several specifications of the facility have been changed.

**Conclusion:** Hospital and Nursing homes design was extremely important for infection prevention. Hospitals and nursing homes owners need to compile the knowledge of the importance of designing buildings and ask architects how to design the buildings for infection prevention. We would like to continue studying abroad and translating the knowledge we acquire to further improve infection prevention there.

## **82: How to achieve a 50% reduction in healthcare-associated Gram-negative bloodstream infections (HA-GNBSIs) over 5 Years**

**Barnass S<sup>1</sup>**, Marshall K<sup>1</sup>, Shadford G<sup>1</sup>, Lamb C<sup>2</sup>, Der Gregorian L<sup>3</sup>, Amanan A<sup>4</sup>, Galabova K<sup>5</sup>, Nagy C<sup>1</sup>, Amin R<sup>1</sup>, Gunzvenzve M<sup>1</sup>, Kruczala K<sup>1</sup>, Walker J<sup>1</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

In May 2017 the Secretary of State for Health launched an ambition to reduce HA-GNBSIs by 50% by 2021 in England. We present our approach to reduce HA-GNBSIs in adults.

### Methods

We set up a Working Group, comprising Specialist Nurses, Consultants, Pharmacists and Managers from Acute, Commissioning and Community Provider Trusts, a General Practitioner and a Nursing Home Manager.

Based on guidance from NHS Improvement, we:

- Established initiatives already underway to reduce GNBSIs, although not necessarily designed for this purpose, mainly in prevention of urinary tract infections (UTIs).
- Conducted a baseline audit to guide our strategy.

With the help of the local Clinical Commissioning Groups' Steering Group, we were able to share best practice, and prioritise activities.

Using 2016 baseline data for *E. coli* BSIs, we set trajectories to achieve a 10% reduction in 2018-19 and 50% reduction by 2021.

Work in progress covers the whole health economy and includes a catheter passport, catheter pack, business case for a Continence Nurse, root cause analysis of "unknown" source cases, training in recognition of deteriorating patients in care homes, and a research proposal to test urine samples early in the UTI pathway for high-risk patients in general practice.

### Results

We will present details of work and outcome data at the conference.

### Discussion

We know we must embed current improvements; further initiatives will be required to achieve the HA-GNBSI target.

### Conclusions

Reduction in HA-GNBSIs is an important aim; we are committed to continuous improvement in patient care to achieve it.

## 108: Patient's role in the implementation of infection prevention and control guidelines (IPCG): a scoping review

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** The failure to implement and adhere to guidelines is one important issue faced in tackling infection prevention and control (IPC). Patient involvement in IPC, by partnering with professionals in the implementation of IPCG, has been regarded as a strategy to increase patient safety. However, such professional-patient partnerships in the context of IPC require clearly defined roles. To date, few studies have explored the patient's role and systematically mapped the existing strategies to involve patients in the implementation of IPCG.

**Objective:** To explore the role of patients and their involvement in the implementation of IPCG.

**Methods:** A scoping review was undertaken to identify recent publications (from 2013 to 2018) on patient involvement in the implementation of IPCG.

**Results:** From an identified 2078 papers, 14 papers were included in this review. Our findings revealed that patient involvement in IPC has been fostered mainly through educational interventions, with video reflexive ethnography in particular being highlighted as a potential strategy to raise awareness on the importance of IPC recommendations. Patient's role in the implementation of IPCG was not clearly described. In general, patients are regarded as vulnerable but also responsible for preventing and transmitting infections. They are viewed as partners with professionals in the implementation of IPCG but also as outsiders of the "professional" process of preventing and controlling infections.

**Conclusions:** The findings of this review endorse the need for targeted strategies to overcome the lack of patient role clarity in the implementation of IPCG.

## 110: A corporate leadership and management perspective on the implementation of guidelines on healthcare-associated infections

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Clinical guidelines aim to improve the efficiency, quality and outcomes of patient care by ensuring that treatment recommendations are based on the best available evidence. A body of literature exists on healthcare workers' perspectives on implementing HCAI guidelines; however, there is a paucity of data on the corporate or clinical managers' perspectives on implementation.

**Objective:** To explore the implementation of National Clinical Guidelines (NCGs) pertaining to MRSA and *C. difficile* in healthcare organizations from the perspectives of clinical and non-clinical managers.

**Methods:** Mixed methods approach comprising qualitative individual interviews (n=16) and quantitative surveys (n=51) underpinned by the Promoting Action on Research Implementation (iPARiHS) framework.

**Results:** Successful implementation requires that clinical and non-clinical managers can access guidelines easily and are able to understand why they are important and relevant. Clinical environments vary and there is a need to study what the implementation of the guideline means in terms of workflow processes, resources, equipment, and cognitive load for staff members. Effective guideline implementation needs to be an organizational priority with overt support from leaders and managers.

**Conclusions:** Guidelines are complex interventions implemented in complex organizations; this requires a systematic approach to all aspects of guideline implementation with the realization that the strategies required for initial implementation are different from the strategies required to ensure the continued sustainability of guideline application over time as staff change and systems alter.

## **123: Investigating the effect of periodontitis associated pathogens and their products on human cell line viability**

**Hickey N<sup>1</sup>**, Whitehead K<sup>1</sup>, Shalamanova L<sup>1</sup>, Dempsey-Hibbert N<sup>1</sup>, Van der Gast C<sup>1</sup>, Taylor R<sup>1</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Oral diseases such as chronic periodontitis (CP) are common within the general population and comorbid within various patient groups such as diabetes and chronic kidney disease (CKD). CP is also a risk factor for myriad other diseases such as cardiovascular disease and CKD. CP is mediated by a wide selection of periodontitis-associated organisms, which are a mixture of the oral microflora and opportunist pathogens. The oral cavity in periodontitis has been identified as a source of systemic inflammation, with infection of the periodontium a potential method of systemic entry for microorganisms along bacterial products, which may induce inflammatory responses in distant tissue by utilizing the circulatory system. We theorise that the putative relationship with CKD could be due to the bacterial products produced in the oral cavity interacting with the human host.

The objective of the study is to investigate the effect of products present in periodontitis-associated bacterial supernatants on cell viability of human cell lines. Multiple periodontitis-associated microorganisms were grown in a specially designed artificial gingival crevicular fluid growth medium. At selected time-points over the organisms growth cycle, colony forming units were recorded and supernatants were sampled and filtered. These supernatants were then added at various dilutions to human cell lines and cell viability was assessed over 48 hours. These findings indicate that at later stages of growth, certain periodontitis-associated microorganisms can elicit an effect on cell viability. This highlights scope for future work based identifying novel biomarkers related to CP and CKD.

## **150: The perceptions of nurses in charge of wards about their role in improving hand hygiene compliance in their unit.**

**Farrugia C<sup>1</sup>**, Cachia Fearne R<sup>1</sup>, Borg M<sup>1</sup>

<sup>1</sup>*Mater Dei Hospital*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Although hand hygiene (HH) is essential in preventing healthcare-associated infections, improving compliance rates remain a challenge. We wanted to assess perceptions of ownership and accountability among nurses in charge of wards (CN) within our 1000 bed acute hospital.

Semi-structured questionnaires were distributed to all CN at Mater Dei Hospital (response rate 87%; n=39), followed by semi-structured interviews with 8 CNs.

Almost all CN (95%) agreed that it is their responsibility to ensure availability of handrub and that nurses and carers in their ward perform HH before patient contact. 85.7% agreed that it was their responsibility to audit HH performance by nurses and carers in their ward. However only 44.4% ( $p < 0.001$ ) agreed that they had similar responsibilities in relation to doctors and allied health professionals (AHPs). 64% of CN stated that they regularly reminded staff during hand over, during meetings and prompted their staff if they forgot to perform HH. However only 33% reported similar initiatives for doctors and AHPs. Interviews identified the main reason being a perception that this is "not my job". CN felt more confident reminding resident staff than visiting staff. Intrinsic and extrinsic factors were identified which influence the contribution of CN towards better HH compliance. One of the demotivating factors was a perceived unfairness of enforcement by the organisation.

These results correlate with anecdotal experiences and could be culturally related. They illustrate the challenges in extrapolating practices from studies undertaken in adhocratic countries to those with higher levels of power distance and uncertainty avoidance.

## **151: Evaluation and adoption of an alcohol free hand rub to help drive reductions in outbreak duration across a national nursing home group**

**Balmer J<sup>1</sup>**

<sup>1</sup>*Sunrise Senior Living*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

A national nursing home group wanted to reduce diarrhoea and vomiting (D&V) outbreak duration from 20-30 days to <7days across their 43 sites.

Effectively managing microbial transmission pathways is key to reducing outbreak duration.

Observation audits and outbreak support visits, highlighted lack of alcohol hand rub use as a hazard and reason for prolonged outbreaks within the organisation.

### Aim

To identify and adopt a more widely accepted hand rub into routine use across the group.

### Methods

A formal, multi-site comparative evaluation of alcohol rub vs. a water-based hand rub took place.

40-staff volunteers across 4-locations/care settings compared products over an 8-day period (3-days alcohol rub; 2-day wash-out period; 3-days water-based rub).

Contact slides were used to determine microbial effectiveness. Structured questionnaires reporting user views on skin integrity and user acceptance were completed after each 3-day test period.

### Results

For both skin integrity and user acceptance there was a significant preference for the water-based rub over the alcohol rub.

Contact slides consistently showed fewer transient bacteria on fingers 5-minutes post application of both rubs. The greatest reduction was noted with the water-based product.

After the successful evaluation, the water-based rub was adopted across the group as part of a multi-point care bundle that has seen D&V outbreak duration reduce from 20-30 days to <7 days across the group.

### Conclusion

Safe, effective, easy-to-use and user-friendly hand hygiene products play a pivotal role in effective hand hygiene practices by ensuring these product are used in the right place and at the right time.

## 157: The impact of screening hospitalized patients with pneumonia for active pulmonary tuberculosis with the Xpert MTB/RIF assay at a single hospital in South Korea

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

In South Korea where tuberculosis (TB) burden is intermediate, the risk of TB exposure in hospitals is still high. Early detection and preemptive isolation of patients with suspected tuberculosis are essential to shorten the exposure duration.

### Methods

We conducted a retrospective observational cohort study of patients with pneumonia who were screened for TB from January 2016 to March 2018 at a 662-bed Korean hospital with 4 airborne infection isolation rooms (AIIR). Routine screening patients with pneumonia before or on admission was implemented in 2017. Screening tools were smear microscopy, polymerase chain reaction (PCR), or Xpert MTB/RIF assay (Xpert). Depending on clinical suspicion, patients were isolated before or after the test results were reported. We evaluated the performance of TB screening tools and compared the exposure duration (in hours) between pre-and post-implementation period.

### Results

A total of 102 patients were diagnosis with TB. During the pre-period, 36 were identified with smear (positivity 16/36, 44%) and PCR (27/36, 75%) and during the post-period, 66 were with Xpert (47/59, 79.7%), smear (17/66, 25.8%), and PCR (50/65, 76.9%). The median exposure duration (62 [IQR 25-106] vs. 18 [0.2-51],  $p < 0.001$ ) and time to identification (52 [IQR 28-98] vs. 27 hours [IQR 11-66],  $p = 0.01$ ) were significantly shortened during the post-period. Time to identification was also shortened by using Xpert comparing to smear or PCR (median 18 vs. 34 vs. 74,  $p < 0.01$ )

### Conclusion

In an intermediate burden setting, screening pneumonia patients with Xpert can reduce the risk of TB exposure at a hospital with limited AIIRs.

## **184: A unique approach to development of resources for front-line healthcare workers. A combined behavioural insights and quality improvement methodology to develop and test resources to support cross-system health and social care workers to reduce Gram-negative bloodstream infections**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Over the past fifteen years across England there have been vast improvements in driving down the rates of healthcare associated infections (HCAI) such as Meticillin Resistant *Staphylococcus aureus* bloodstream infections (BSI) and *Clostridium difficile* infection. Despite multimodal efforts, Gram-negative BSI have continued to increase year on year. As a result, the UK Government set an ambition to reduce HCAI GNBSI by 50% by 2021. A cross PHE and NHS Improvement (NHSI) team set out to develop tools and resources to support health and social care workers in meeting these ambitions. The approach taken in the development of these resources was unique as we used a combination of behavioural insights, quality improvement and front line collaboration to ensure that the resources were designed around the needs of those who would use them.

Guided by the SHEL (Software, Hardware, Environment, and Liveware) model, the COM-B model of behaviour (Capability, Opportunity, Motivation), and the EAST framework (interventions should be Easy, Attractive, Social and Timely), we developed resources that focused on cross-system health and social care workers and tested these with focus groups. Following the collaborative development phase, these resources were published and were further tested with clinical commissioning groups (CCGs) over a period of six months. Using the quality improvement PDSA (plan, do, study, act) cycle, we modified the resources based on the feedback and the resultant set of resources and tools are now published on the NHSI website and have received 2,924,582 hits since it was launched in May 2017.

## **188: Preventing *Escherichia coli* bacteraemia through improved community uti management – Use of the TARGET Uncomplicated UTI audit tool in primary care**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

The urogenital tract is the commonest source for *E. coli* bacteraemia nationally. Prior treatment for urinary tract infection (UTI) within the preceding 4 weeks was the largest independent effect associated with a urinary source in a national sentinel surveillance study. Clinical consultation for UTI then offers a critical intervention point in *E. coli* sepsis prevention.

Public Health England's (PHE) TARGET toolkit includes an 'Uncomplicated UTI' audit template and patient leaflet for primary care, enabling self-audit against PHE's Diagnosis of Urinary Tract Infection guidance.

### Methods

A retrospective audit of uncomplicated UTI management was conducted in January 2018 at one GP practice in North London using EMIS electronic patient records. An EMIS read code search of all patients seen with UTI within the preceding month was undertaken. This identified 40 patients for inclusion. 2 GP registrars manually reviewed the records completing the TARGET UTI tool.

### Results

97% (36/40) patients received the correct antibiotic, 83% (30/36) the correct duration. 62.5% (25/40) received safety netting advice. 35% (14/40) self-care advice, 15% (6/40) guidance on natural history of UTI and 2.5% (1/40) received information on antibiotic resistance and use. No patients were offered the TARGET UTI leaflet at baseline.

### Conclusions

Findings were fed back to the CCG prescribing advisor, CCG Quality and Safety Manager and staff at a governance meeting with a recommendation to embed the TARGET UTI patient leaflet on EMIS and re-audit.

Greater attention must be given to counselling patients with UTI to deliver reductions in healthcare associated Gram-negative bloodstream infections.

## 197: Epidemiology and microbiology of *Aeromonas* infection in State of Qatar

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<sup>1</sup>Hamad Medical Corporation

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** *Aeromonas* is an environmental Gram-negative bacteria. It can cause wide variety of infections. Our goal was to explore the epidemiology and microbiology of *Aeromonas* infection and to identify the mortality associated factors in Qatar.

**Methods:** Medical records of patients above 14 year old with *Aeromonas* infection were reviewed retrospectively between 2012 and 2016 at 4 main hospitals. *Aeromonas* species was identified by BD Phoenix. Mortality was defined as death within 30 days. Immunocompromised status includes patients with malignancy, transplant, or immunosuppressive therapy. Descriptive data were presented as mean standard deviation.

**Results:** Ninety-eight patients were identified. The mean age was 44.8 year. 77.6% were men. Diabetes was identified in 27.5% of patients, hypertension 23%, chronic kidney disease in 10.2%, and 5.1% chronic liver disease. 39.7% of the patients were in immunocompromised status (5 patients had organ transplant, 15 had hematological malignancy, 16 had solid malignancy, 3 patients on immunosuppressive medication). 35.7% of infections were primary bacteremia, 31.6% skin and soft tissue infection, 19% abdominal infection, 4% urinary tract infection, 3% eye infection and 6% others. 32.7% of infections were hospital acquired. Mortality rate was 10.2%. Identified *Aeromonas* species were, *A. hydrophilia* 31.6%, *A. veronii* 27.6%, *A. caviae* 22.5%, and *A. sobria* 18.4%.

**Conclusion:** primary bacteremia, skin and soft tissue infection are the commonest infections. Immunocompromised status possibly is a predisposing factor for the infection. High frequency of the infection is hospital acquired. This may highlight the need for infection control measures in presence of *Aeromonas* infection. *A. hydrophila* is the commonest isolated species.

## 199: What is the safest way to prepare infant formula feeds for high risk paediatric patients in healthcare facilities

**Dunn H<sup>1</sup>**, Asadi F<sup>1</sup>, Wright P<sup>1</sup>, Zabuir A<sup>1</sup>, Hartley J<sup>1</sup>, Cloutman-Green E<sup>1</sup>

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

Special feed units in paediatric hospitals prepare powdered feeds for high-risk patients, who could suffer significant clinical complications from microorganism ingestion. Following reconstitution of the powdered feed they are treated by pasteurisation or blast chilling (BC). No evidence exists as to what method of treatment is safest for these high-risk infants.

### Methods:

#### Phase One:

Feeds were inoculated separately with  $>10^7$  of three different organisms following reconstitution. Feeds were then treated. Serial dilutions were then undertaken to study the effect of the different treatment methods used at day 0 following inoculation and at 24 hrs following overnight storage at 2 – 4°C.

#### Phase Two:

A semi-structured questionnaire was designed. 20 paediatric hospitals were identified and a response was received from 12 hospitals.

### Results:

#### Phase One:

Feeds treated by pasteurisation had no growth using Miles and Misra during the inoculation stage. BC showed organisms present at the same level before treatment with little change at 24hrs across all three organisms ( $\sim 10^5$ ).

#### Phase Two:

Two hospitals used pasteurisation. Seven hospitals were using BC and three hospitals used no post processing treatment. Reasons for treatment method included cost (n=3), staff time (n=2), best practice (n=3), not aware of treatment rationale (n=3).

### Conclusions:

There is a lack of understanding of the rationale behind processes being utilised. If hospitals are treating feeds after reconstitution to provide protection to high-risk patients then the method used by the majority of hospitals is not suitable.

## 236: Guidelines for the prophylaxis and treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) in the United Kingdom: 2018 update

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Objective

To identify contemporary evidence for the treatment and surgical prophylaxis of methicillin-resistant *Staphylococcus aureus* (MRSA).

### Methods

The Cochrane Library, EMBASE and MEDLINE were searched (2007-2016) for eligible clinical trials/studies that included patients with proven MRSA infection. Primary outcome was clinical and/or microbiological cure.

### Results

Thirty three studies were reviewed. Nine new drugs were described and compared to usual therapies. Most studies (n=24) considered MRSA-positive skin and soft tissue infections, several of which were non-inferiority studies performed for licencing purposes. There was an apparent increase in mortality when high dose co-trimoxazole was used rather than vancomycin to treat bacteraemia. Linezolid was favoured for clinical cure of MRSA pneumonia when compared with vancomycin. A significant difference between prophylactic regimens was identified within cardiac surgery and cerebrospinal shunt placement procedures. There was no difference in clinical outcome between antibiotic regimens given following abscess drainage; however, children infected with MRSA who received antibiotic treatment following drainage of uncomplicated abscesses had a higher treatment failure rate when co-trimoxazole was given for only 3 days compared with 10 days.

### Conclusions

We found no evidence of improved efficacy with high doses of daptomycin in SSTI; however, potential improved outcomes with linezolid in MRSA pneumonia and vancomycin in MRSA bacteraemia were identified. Evidence suggests that if an uncomplicated abscess is successfully drained, the patient may not need antibiotics.

## **238: WeChat public platform-based intervention may improve health seeking behavior of tuberculosis among urban residents in China**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background** Our previous published meta-analysis reported incorrect health seeking behavior consisting in healthcare-associated-TB spreading in China. Therefore, we conducted a prospective study to assess the effect of WeChat public platform-based intervention on TB knowledge, attitudes and behavior.

**Methods** Study involved a longitudinal intervention for 3 months among a representative sample of urban residents in Beijing. Participants subscribed WeChat public account of FeiyanFeiyu which means "Be aware of the differences between Health lung and Sick lung with TB". These subscribers were divided into the interact group and free-interact group. From May 9 to August 1 in 2016, 27 articles about TB prevention and compulsory healthcare policy were disseminated via FeiyanFeiyu, whereas in the interact group, a quiz for a phased summarization and a lucky-draw cash prize as an incentive for adherence were offered each month. **Results** In the baseline and deadline surveys, 520 and 606 questionnaires were collected, respectively. The percentage of correct answers about suspected symptoms, probable transmission mode, credible diagnosis, regular treatment duration, and the national policy for TB was significantly enhanced. Participants' intention to seek healthcare was synchronously improved as they recognized the signs of TB. Older age and higher educational background were independently associated with the first visiting of TB dispensaries; whereas income and insurance type affected the first visiting of tertiary hospitals. There was no difference about behavior intention between the interact group and free-interact group.

**Conclusions:** WeChat platform is effective for improving TB awareness, which provides an easy access to education among social network online.

## **240: Clinical practice in obtaining, and the diagnostic yield, of blood and urine cultures in 300 consecutive septic patients attending a university teaching hospital.**

**O'Higgins L<sup>1</sup>**, Orr C<sup>1</sup>

<sup>1</sup>*Mater Misericordiae University Hospital*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Aim:** To determine the practice of clinicians in obtaining blood and urine cultures in a large cohort of patients consecutively presenting to the emergency department and an analysis of their diagnostic utility.

**Method:** We examined the records of 300 consecutive patients admitted under a medical team via the emergency department. We determined whether blood and/or urine cultures had been taken and where these identified meaningful positive isolates. Two criteria for suspected sepsis were incorporated, including the admitting doctor's impression as recorded in medical notes and/or a CRP  $\geq 30$  mmol/L.

**Results:** 123 fulfilled the criteria of suspected sepsis (n=123). 106/123 (86.17 %) had a CRP  $\geq 30$  (mean 106, range 30- 387,) and 17/123 (13%) with a CRP  $\leq 30$  were included based on the admitting doctor's impression. 63/123 (51.2%) had a set of blood cultures taken with 6 (4.87%) having more than one set in 24 hours. Of these 11/63 (17%) had a meaningful isolate. 82/123 (66.6%) had urine cultures sent. 22/82 (26.8 %) had a meaningful isolate.

**Discussion:** Blood and urine cultures are simple, widely available, inexpensive, non-invasive investigations . Our results demonstrate that 17% of blood cultures and 34% of urine cultures resulted in a positive, meaningful yield. Given the strong positive yield, there is a compelling argument that all patients presenting with suspected sepsis have these investigations.

**Conclusion:** Our results show that in patients with suspected sepsis, simple blood and urine cultures often yield positive results thereby guiding efficient management and treatment.

## 257: Management of CPE patient contacts; the experience of an Irish Voluntary Hospital.

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<sup>1</sup>St Johns Hospital, <sup>2</sup>Graduate Entry Medical School University of Limerick, <sup>3</sup>4i Centre for Interventions in Infection, Immunity and Inflammation, University of Limerick

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background - Carbapenemase Producing *Enterobacteriaceae* (CPE) are endemic in many Irish hospitals resulting in CPE being declared a public health emergency (October 2017). Subsequently, an expert group mandated that all CPE contacts (those exposed to CPE positive patients) discharged to the community be advised of their status retrospectively and prospectively beginning September 2018. Prior to this no agreed approach existed. However, since 2011, St Johns' Hospital (SJH), an 89 bed acute voluntary hospital with a dedicated Infection Control specialist Nurse (ICN), proactively disclosed CPE exposures.

Aim - Sharing patient reactions following disclosure of CPE exposure.

Methods – Retrospective review of CPE exposure incidents and management of discharged contacts at SJH from January 2017-August 2018. Review of disclosure of CPE contact status to patients re-admitted for day-case endoscopy during that period.

Results – Eight exposure incidents resulting in 38 patient contacts. 16 CPE contacts had been discharged before exposure was confirmed. All were informed via proforma letter and CPE fact-sheet, followed by telephone call. All patients appreciated being informed and availed of screening opportunities. No one tested positive. Conversely, 13 CPE contacts were advised of their status upon presentation for day-case procedure between January and August 2018. Each met individually with the ICN, expressed annoyance at not being informed, and questioned the reason. Despite this, all availed of screening opportunities.

Conclusion – The decision to inform patients of CPE status is welcomed. However, prudent management of the process is needed if unnecessary patient concern and frustration are to be avoided.

## 139: Seroprevalence of measles, mumps and rubella virus antibodies among healthcare personnel in singapore

**Oh H<sup>1</sup>**, Chen J<sup>1</sup>, Kam C<sup>1</sup>

<sup>1</sup>*Changi General Hospital*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

In Singapore, measles, mumps and rubella (MMR) vaccine was introduced as one-dose in 1990 and two-dose in 1998. Since 2014, Ministry of Health has recommended MMR vaccine as part of immunization for healthcare workers.

### Objectives

The aim of this study was to evaluate the seroprevalence of MMR antibodies in healthcare personnel in Changi General Hospital (CGH).

### Method

Health screening of CGH employees was conducted in September 2016. Sera from random sample of healthcare personnel, age 21- 75 years were enrolled in 3 age groups: 21-60 years, 31-40 years and >41 years.

Human IgG antibodies against MMR viruses were measured using enzyme – linked immunosorbent assay kits, (IBL International GmbH Hamburg, Germany). Univariate analysis was performed using Pearson's chi-squared test.

### Results

452 healthcare personnel were recruited; 150 healthcare personnel in 21-30 age group, 151 in 31-40 age group and 151 in  $\geq 41$  age group.

The seroprevalence of antibodies against measles was 76.3%; decreasing from 93.4% in >41 age group , 77.5% in 31–40 age group to 58% in 21-30 age group. ( $p<0.001$ ). The seroprevalence of antibodies against mumps was 74.6%, remaining above 70% in all age groups ( $p=0.704$ ). The seroprevalence of antibodies against rubella was 92.5% with lowest (86.8%) in the >41 year age group ( $p=0.003$ ).

### Conclusions

A significant proportion of healthcare personnel lacked immunity against measles with lowest seropositivity in 21 – 30 year age group. There is a risk of nosocomial measles outbreak due to measles immunity gaps among young adults who are not targeted by routine immunization.

## **239: Influenza vaccination of healthcare workers: Knowledge and attitudes among 9,177 hospital employees in two Norwegian hospital trusts.**

**Lingaas E<sup>1</sup>**, Sandness Y<sup>2</sup>

<sup>1</sup>*Oslo University Hospital*, <sup>2</sup>*Vestre Viken Hospital Trust*

Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

In Norway, the proportion of healthcare workers accepting seasonal influenza vaccine has traditionally been rather low, in many hospitals typically between 10 and 20 %. In an attempt to increase vaccination coverage, many hospitals have launched information and motivation campaigns over the last few years with some success. However, these campaigns have in general not been based on implementation science or theories of behaviour change. We therefore wanted to do a systematic survey of knowledge and attitudes among hospital employees in order to use the results in a directed campaign to increase vaccination coverage.

### Methods

All employees (approximately 35.000) in two Norwegian hospital trusts were invited by e-mail to respond to a questionnaire (Questback<sup>®</sup>) on knowledge, opinions and attitudes to seasonal influenza vaccination. The questions were set up according to the theory of planned behaviour.

### Results

9,177 employees (approximately 26 %) responded. There was a clear distinction between those who intended to be vaccinated before the 2018/2019 season, and those who did not plan to be vaccinated. The dominating reasons given among personnel in favour of vaccination were "altruistic", i.e. protection of patients, family and friends. Among personnel not planning to be vaccinated the dominating reasons given were "personal", i.e. not considering to be at risk themselves, particularly not at risk for serious complications.

### Conclusions

The results will be used to try to influence personnel hesitant to vaccination according to the theory of planned behaviour and the stages of change /transtheoretical model before the 2018/2019 influenza season.

## 21: Lessons learnt from an ESBL *Enterobacter cloacae* outbreak at a neonatal unit

**Ling M<sup>1</sup>**, Karlin R<sup>1</sup>, Tan K<sup>1</sup>, Ko K<sup>1</sup>, Abdul Rahman N<sup>1</sup>, Bharadwaj S<sup>1</sup>, Koh T<sup>1</sup>, Chan D<sup>1</sup>

<sup>1</sup>*Singapore General Hospital*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction:

An ESBL *Enterobacter cloacae* outbreak involving 7 neonates occurred in a 28-bedded neonatal unit in October 2017 at an acute tertiary hospital in Singapore. Five neonates had the outbreak strain isolated from eye, endotracheal aspirate, sputum and blood whilst 2 were identified through contact tracing.

### Aim:

This paper details lessons learnt from the outbreak management.

### Method:

A multidisciplinary team comprising neonatologists, Infection Prevention & Control (IPC), infectious disease, nursing was activated to manage the outbreak. Contact tracing was conducted for exposed babies in the ward (intensive care, high dependency and nursery). Environment samples from sinks and curtain blinds were also taken for culture. The outbreak strains were typed using pulse field gel electrophoresis (PFGE) and whole genome sequencing (WGS). Effective control measures used include enhanced hand hygiene, contact precautions, environmental decontamination with hydrogen peroxide vapour and changing of P traps in sinks; as well as clinical care of outbreak cases managed by separate dedicated teams.

### Results:

Seven sink samples yielded the outbreak strain. PFGE typing showed similarity with 6 clinical and 3 environmental strains; whilst WGS confirmed clonality with strains from 3 patients in 2016.

### Conclusion:

The outbreak highlights the role a contaminated sink play in causing an outbreak amongst vulnerable patients. Infection reviews have been started for neonates who fulfilled criteria for suspected healthcare associated infections, new, emerging or unusual pathogens to help in early detection of future clusters. This is done by a team comprising attending neonatologist, ward nurse clinician, IPC nurse, IPC linked doctor and nurse.

## **34: What lies beneath: impact of an expanded screening program to control spread of carbapenemase-producing *Enterobacteriaceae***

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Control of carbapenemase-producing *Enterobacteriaceae* (CPE) is one of the most important infection control issues facing healthcare organisations today. In early 2017, our 1000 bed hospital noted an increase in hospital-acquired infections with CPE.

### Methods

An existing CPE screening program was in place at that time. Screening was performed on patients with a history of foreign health care, patients with recent (<6 months) admission to other healthcare institutions, renal dialysis patients and patients admitted to ICU. An expanded CPE screening program was instituted in March 2017, which included patients admitted to HDU, and weekly screens for inpatients of multi-bedded wards (starting from Day 7 of hospital admission).

### Results

The number of CPE screens rose from 488 tests in Jan 2017 to a maximum of 1804 tests in Jan 2018. The rate of detected CPE carriage was 1.09/10,000 inpatient days in Jan 2017, abruptly rose to 8.37 following implementation of the expanded screening criteria and reached a maximum of 10.64 in Oct 2017, before eventually stabilising at ~4.0 in 2018. The predominant CPE genes were NDM (n=130), OXA-48-like (n=33), IMI (n=33) and KPC (n=19). Hospital-acquired CPE infections peaked at 1.13/10,000 inpatient days in Jan 2017, but reduced to 0 in 2018.

### Conclusion & Discussion

An expanded screening program identified a large circulating pool of occult carriers and silent transmission, but significantly increased testing workload. Reduction in CPE acquisition and carriage was slow, but eventually translated to a reduction in CPE infections.

## 48: One-year molecular surveillance of carbapenem-susceptible *A. baumannii* on a German intensive care unit: from diversity to clonality

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

We observed a high endemic rate of carbapenem-susceptible *Acinetobacter calcoaceticus*-*Acinetobacter baumannii* (ACB)-complex in clinical specimen on a 32-bed operative intensive care unit of a German tertiary care center and decided to install a pathogen-based surveillance.

Between May 2017 and March 2018 the laboratory surveillance information system was searched once daily for ACB-complex isolates. During the study period 44 patients were found to be colonized/infected with a carbapenem-susceptible ACB-complex isolate of which 39 were classified as hospital-acquired (> 48h after admission). Nearly all were identified as *A. baumannii*, only four as *A. pittii*, by a multiplex PCR targeting the *gyrB* gene. Genotyping using PFGE and whole genome sequencing (core genome MLST, SeqSphere+ software, Ridom) revealed two clonal clusters: cgMLST cluster type 1769 (n= 8 patients); cgMLST cluster type 1770 (n= 12 patients). All other isolates were distinct. Six patients developed infections with *A. baumannii*. Infection control measures introduced were as follows: Standard and contact precautions, hand hygiene training, additional cleaning and disinfection incl. UV-light, targeted screening for carbapenem-susceptible *A. baumannii* and environmental sampling. Environmental sampling revealed a relevant dissemination. Introduction of the enhanced screening revealed a significant earlier detection during hospitalization. The outbreak was successfully ended at the beginning of January 2018. In conclusion, a pathogen-based surveillance of ACB-complex based on full identification, classic epidemiology and genotyping revealed an endemic and epidemic situation with two simultaneously occurring outbreaks. This underlines the importance of such methodology for surveillance purposes in a highly endemic setting for a targeted approach within the hospital setting.

## 50: An outbreak of vancomycin resistant *Enterococcus faecium* (VRE) in a nephrology department

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

We present an outbreak of VanA-positive VRE in the nephrology department of a tertiary care facility. VanA-positive VRE were detected in 37 patients from June 2016 to June 2017: in 33 carriers and in 4 clinical cases. Multilocus sequence typing and pulsed field gel electrophoresis performed by the National Reference Centre revealed a polyclonal outbreak.

Transmission was controlled by cohorting VanA VRE+ patients with dedicated healthcare workers, enhanced cleaning and disinfection procedures and (re-)education of staff and patients. Weekly screening of all hospitalized patients in the nephrology ward assured a timely identification of unknown carriers or new transmissions. Additionally, the outbreak support team of the Flemish government was consulted. They took part in several meetings, did unannounced observations on the wards and took samples of the environment and hands of the health care workers. No VRE was detected, but some samples revealed a high total plate count. In June 2017, the routine weekly screenings were stopped given > 4 weeks' time since the detection of last new positive carrier. Since the end of the outbreak we detected 3 patients, of which one in a clinical sample.

In conclusion, the outbreak and its introduced actions had a large impact on patients and health care workers. Continuous vigilance is necessary to prevent new clusters in this risk population. Cohorting, hand hygiene and intensified disinfection measures of reusable materials were key points in the control of this outbreak.

## **80: Transmission of vancomycin resistant *Enterococcus faecium* controlled by deep cleaning and enforcement of standard precautions**

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall, November 26, 2018, 5:15 PM - 6:15 PM

**Background:** At Odense University Hospital, Denmark, vancomycin resistant *Enterococcus faecium* (VREfm) was a rare finding until mid-2016 when numbers started to rise among patients admitted to the intensive care unit and the haematology department.

Whole Genome Sequencing (WGS) of the VREfm in June 2017 suggested that patient to patient transmission took place in the haematology department. The outbreak involved seven patients.

**Materials/methods:** Patient admission histories suggested transmission through environmental surfaces. An audit in the department revealed need for improvement of compliance with standard precautions, particularly hand hygiene, cleaning and disinfection of utensils and patient care items, and basic cleaning of the ward. A tidying up of the entire department took place before cleaning the environment, followed by non-touch automated disinfection with hydrogen peroxide or manual disinfection with chlorine. This was performed not only in patient related rooms, but also in rinsing, storage, and staff rooms. Curtains between patient beds were replaced with privacy screens with hard wipe surfaces.

**Results:** After the interventions, no further patients with VREfm related to the outbreak strain were found. The interventions also resulted in a reduced incidence of VREfm in the Intensive Care Unit.

**Conclusions:** The results underline the central role of standard precautions and cleaning to control transmission of VREfm in hospital settings. Cleaning and room disinfection of the entire department probably played a decisive role in stopping the outbreak. Further our results point to the relevance and need for audits to ensure adherence to standard precautions in hospital wards.

## **89: Governmental surveillance systems for nosocomial outbreaks: a systematic literature review**

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Detection and management of Nosocomial Outbreaks (NO) is a challenge for countries worldwide, mainly at governmental scope. Aim: To describe governmental surveillance systems for NO. Methods: systematic review carried out on PubMed, Embase, Eurosurveillance and the Latin American and Caribbean Health Sciences Literature database. We included studies published from Jan 2007 to June 2017 describing governmental surveillance of NO. We searched the components of systems: NO definition, methods for detection and report, types of NO of interest. Results: France, Germany, Norway, England and New York State in USA (NYS) established a mandatory reporting for NO. Germany, use broad NO definition ("Two or more epidemiologically linked nosocomial infections"). England and Norway use similar definition with an additional element ("an incidence higher than expected"). NYS and France have specific definitions depending on aspects such as association with contaminated products or devices. Germany and Norway use laboratory results as a trigger for detecting NO, and England uses statistical analysis of regular reports of nosocomial infection rates. A timeframe for reporting is defined in Norway ("prompt"), NYS and England (24h). The responsibility for NO reports is attributed to healthcare facilities (France and Norway), healthcare workers (Germany) or infection control professionals (NYS and England). Follow up reports are required in Germany, England and Norway. All countries use electronic systems for reporting, except France, which uses a paper form. Conclusion: There is high variability among countries regarding governmental NO surveillance systems. This may hinder opportune inter-countries communication concerning NO of potential international public health relevance.

## **93: Vancomycin resistant enterococci (VRE) outbreak on ICU: is on-going active screening indicated?**

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<sup>1</sup>*Royal Berkshire NHS Foundation Trust*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

VRE infection accounts for increased mortality and hospital costs. It is also known that VRE colonisation precedes infection. UK national guidelines for Glycopeptide resistant enterococci recommend active screening during outbreaks and in response to incidents, based on risk assessment.

ICU patients are at increased risk of VRE colonisation, by undertaking active screening we wanted to assess the magnitude of VRE colonisation and its impact on VRE infections.

RBH is a 720 bedded hospital with 17 ICU beds including two single rooms. Since July 2013 active VRE screening using rectal swabs was undertaken on admission, weekly and before discharge.

From July 2013 to March 2017, overall percentage of VRE colonised patients on ICU (to total days of care per year) increased from 0.79% to 1.65%. In December 2015 an outbreak of VRE infections was declared involving three patients. Antibiotic stewardship and IP&C measures like reinforcement of hand hygiene, use of PPE, importance of adherence to standard precautions and uniform policy, use of rectal tubes for patients where indicated, prompt isolation of patient to single room, monthly central line audits, de-cluttering of ICU, restricting the use of blood gas analyser by neighbouring departments, consistency in documenting twice daily cleans and undertaking terminal clean upon patient discharge, deep clean after the outbreak and yearly, also regular environmental audits.

Despite increases in percentage of VRE colonised patients, there has not been any VRE infection identified on the unit since the outbreak, as active screening focuses ICU and IP&C resources to colonised patients.

## 101: The application of real-time whole genome sequencing to control an outbreak of *Streptococcus pyogenes* at a UK specialist orthopaedic hospital

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<sup>1</sup>Royal National Orthopaedic Hospital NHS Trust

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Following the death of a patient from a *Streptococcus pyogenes* Group A bacteraemia, an outbreak investigation was conducted. Upon contact tracing and screening of patients and staff, 12 isolates of Group A *Streptococcus* (GAS) were identified. Typing of these isolates demonstrated that 6 of these isolates were emm 1.0, including the index case and 5 healthcare workers. Whole genomic sequence (WGS) analysis was undertaken on these 6 emm 1.0 isolates: 5 were indistinguishable by genomic single-nucleotide polymorphism analysis, with a 0 SNP distance; and one had a one SNP difference, supporting the hypothesis of recent local transmission. All positive healthcare workers were offered antibiotic treatment with penicillin or clindamycin and were asked not to return on duty until they completed at least 72 hours of antibiotic treatment and were asymptomatic. No further cases were identified. The increased molecular discrimination of WGS confirmed the clustering of these cases but was unable to establish the directionality of spread, limited by low potential transmission, exposure period. This case demonstrates the clinical utility of WGS in managing outbreaks of iGAS.

## 141: A *Clostridium difficile* 027 outbreak in a busy District General Hospital

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

*Clostridium difficile* infection (CDI) is a well-recognised cause of nosocomial diarrhoea and its prevention is one of the top priorities of hospitals. *C. difficile* ribotype 027 has been associated with multiple hospital outbreaks in the past and is associated with severe disease and higher mortality. There is significant decline in the incidence of this ribotype during the last few years but sporadic cases still occur.

### Description

We report an outbreak of CDI associated with ribotype 027 in an elderly care ward in East and North Hertfordshire NHS Trust. In total we had 8 patients between February-May 2018 with ribotype 027. Toxin production was detected in 7 patients. Most of these cases were identified retrospectively when the ribotyping results were available.

### Findings

During investigations several contributing factors were identified that briefly include inadequate system of assurance for implementation of Infection prevention and control (IPC) practices, manual systems of surveillance led to delayed identification of outbreak, poor standards of cleaning both of environment and equipment and finally damage in the equipment that rendered it not amenable to be cleaned properly.

### Measures

Several actions were instigated with the help of learnings identified from this outbreak. The ward was closed for refurbishment; a mattress audit was conducted resulting in replacement of 400 mattresses across the trust. Introduction and implementation of IPC surveillance, reporting and management software system was agreed. An IPC steering group was commissioned foreseeing improvement plans.

### Conclusion

This outbreak highlights the importance of robust surveillance system, ribotyping testing, thorough cleaning.

## 168: Use of a rapid molecular test to detect *Staphylococcus aureus* environmental contamination during an outbreak

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Environmental microbiological sampling can be of value in outbreak investigations. Whole genome sequencing confirmed an outbreak of Borderline Oxacillin Resistant *Staphylococcus aureus* (BORSA) on a dermatology unit, with spa typing confirming it to be t10939. Following enhanced environmental cleaning, environmental microbiological sampling was performed using a commercially available rapid molecular diagnostic test and the results compared to microbiological culture.

### Aims

To evaluate the use of a rapid diagnostic test to detect *Staphylococcus aureus* environmental contamination.

### Materials and Methods

Environmental areas sampled included: top side of dressing trolley; shower head; mattress cover; dustpan; patient chair; tympanic probe; ward floor; toilet seat; bath tap and plug hole. Sites were sampled using both standard microbiology swabs and the sponge method and cultured using standard laboratory methods. MALDI-TOF (Bruker Diagnostics, Germany) was used for organism identification and Vitek 2 (bioMérieux, Marcy L'Etoile, France) for antibiotic susceptibility testing. Cepheid GeneXpert® MRSA/SA BC Assay (Cepheid, Sunnyvale, CA, USA) was used to sample sites directly.

### Results

*S. aureus* was cultured from 6 environmental sites (shower head, dustpan, patient chair, tympanic probe, bath tap and plughole), with the sponge method positive in 5 instances and standard swab positive in 4. However only 3 sites had concordant results. The Cepheid MRSA/SA BC Assay was positive for all 6 sites positive by either of the other methods. Additionally it gave a positive result from the floor which had previously cultured *S. aureus*.

### Conclusion

Cepheid GeneXpert® MRSA/SA BC Assay can be used to give an indication of environmental contamination by *S. aureus*.

## 171: Unusual fungemia caused by *Pseudozyma aphidis* in neonates in neonatal intensive care unit

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**BACKGROUND:** *Neonatal candidemia* is associated with high mortality and morbidity. This study reports an outbreak in neonatal NICU caused by *Pseudozyma aphidis*.

**METHODS:** A total of 9 neonates with candidemia were identified in the NICU from October 2015 to February 2016. The study describes the setting, clinical course, methods used to identify and investigate the outbreak including interventions to control. All neonates, healthcare staffs, mothers, immediate environment and devices in NICU were screened for colonization, to determine source and possible modes of transmission. Clinical and surveillance samples were processed using standard methods. sequencing was used for final identification.

**RESULTS:** *Pseudozyma aphidis* was isolated from 9 neonates (7male) with mean gestational age of 29 weeks. All neonates were low birth weight and majority (78%) were delivered vaginally. Maternal risk factor included Premature rupture of membrane (33%), use of antibiotics (22%) and steroid (67%) in mothers before delivery. Neonatal risk factor were use of ventilator (44%). Amphotericin B was used for treatment and mortality rate was 67%. Source of infection could not be traced. Analysis indicated the outbreak was associated with single clones of *Pseudozyma aphidis*. The outbreak was controlled by strengthening infection control practices like hand hygiene practices, disinfection policy, cohorting of neonates, confining healthcare workers to the cohort of infected patients.

**CONCLUSION:** This is the first report of unusual fungemia in neonates in India. Strict infection control measures should be implicated in high risk areas like NICU to prevent outbreaks.

## 178: Establishing a whole genome sequencing service for the investigation of healthcare-associated infections

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Determining whether transmission has occurred is a major challenge for Infection Prevention and Control Teams (IPCTs). Typing results do not always have sufficient granularity or robustness to unequivocally define strains and epidemiological data is not always available to establish links between patients and the environment.

### Aim

To develop methodology and make recommendations of how to establish a WGS service for the investigation of healthcare associated infection (HAI) outbreaks in real-time.

### Materials and Methods

A WGS service was established over a five year period aiming to confirm or refute outbreaks in real-time in NHS Tayside and NHS Grampian. Bacterial isolates underwent WGS (MiSeq, Illumina) and bioinformatic data analysis by the Infection Group, School of Medicine, University of St Andrews, whilst isolates were sent in parallel to the relevant reference laboratories for routine pheno- and genotyping.

### Results

Over 400 isolates were sequenced from more than ten outbreak investigations. Organisms varied in resistance and included MRSA, VRE, CRE, ESBL and the newly identified *optrA* gene positive enterococci. WGS provided results with greater resolution than routine typing methods.

### Conclusion

WGS was particularly useful in the investigation of outbreaks involving rare organisms e.g. *Listeria monocytogenes* and for identification of new resistance determinants e.g. *optrA* gene. IPCTs should consider asking for a variety of samples (including repeats and sequential) as patients may carry more than one VRE strain and consider sequencing vancomycin sensitive enterococci in VRE outbreaks. Implementing WGS as a standard of care in real-time would be a major advance in day-to-day IPC practice.

## 187: GRE outbreak management in University Hospitals of Morecambe Bay NHS Trust

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<sup>1</sup>University Hospitals Of Morecambe Bay Nhs Ft

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Glycopeptide resistant *Enterococci* (GRE) are resistant organisms those live in the gut and survive in the environment therefore they are hard to control and required substantial financial investment for control their spread in hospital setting.

UHMB hospitals have been experiencing increasing prevalence of GRE in clinical specimens that led us to introduce control measures to prevent local spread of GRE.

Since October 2015 nearly 90 isolates have been sent away for epidemiological typing (PFGE typing) from clinical isolates and from screening samples. 10 different epidemiological lines have been identified in Royal Lancaster Infirmary (RLI) and 3 different epidemiological types in Furness General Hospital (FGH) in the last 2 and half years. There has been clear links found in between patients with same typing results that suggested local hospital spread of the GREs. These typing results led us to introduce control measures to prevent further spread of GRE in hospital setting. We introduced rectal screening, contact isolation, fogging, electronic alert of colonised patients and their contacts, antibiotic review of those patients by consultant microbiologist. These control measures could only be introduced on surgical wards but not on medical wards due to the lack of isolation capacity. Due to the early intervention and good compliance with infection control no local outbreak has been identified in FGH since November 2016, whilst there is a predominant strain (RLAN00EC-5) lurking around in RLI. The last episode of bacteraemia was identified in June 2018. This episode is under investigation.

## **220: Investigation into the transmission route from contaminated sink drains as environmental reservoir to patients during a major CPE epidemic**

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<sup>1</sup>Zna

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Background:** We previously demonstrated the role of contaminated sink drains as the environmental reservoir of a long-term CPE epidemic in one of our intensive care units, and the decontamination of this reservoir as the key intervention in order to control the spread of CPE. Since previous attempts including strict implementation of standard and additional precautions and antibiotic restrictions had failed to control the epidemic, we hypothesized that transmission from sink to the patient and healthcare workers occurs through aerosol and droplets.

**Method:** In order to document the mechanism of transmission of CPE from contaminated sink drains to ICU patients, we set up an experiment comparing the contamination, decontamination and aerosol formation with CPE in different types of sinks.

**Results:** Our study demonstrates that the design of hospital sinks plays a capital role in the contamination of patients with CPE from the environmental reservoir. The position of the faucet, the inside slope of the sink and other design factors directly influence aerosol- and droplet formation. CPE were demonstrated in air, aerosols and on surrounding surfaces during and after handwashing, thus potentially contaminating healthcare workers and patients nearby. Decontamination of the sink drains with acetic acid effectively eradicates the spread of CPE.

**Conclusion:** straightforward structural modifications to existing sinks and new design of sinks can effectively prevent the spread of Gram-negative nosocomial pathogens from the environment to patients and play a major role in the management of hospital outbreaks due to multiresistant organisms.

## 235: Outbreak of carbapenem resistant *Pseudomonas aeruginosa* in a plastic surgery/burns unit.

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<sup>1</sup>NHS Greater Glasgow and Clyde

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

*Pseudomonas aeruginosa* is a significant pathogen in plastic surgery/burns. We describe an outbreak of a carbapenem resistant *Pseudomonas aeruginosa* in a regional plastic surgery/burns unit and the local intensive care unit and the infection control precautions used to bring it under control.

### Description of the outbreak

This involved 5 patients on a plastic surgery burns unit and intensive care unit. With a multi drug resistant *Pseudomonas aeruginosa* sensitive to gentamicin and colistin only. The mechanism of carbapenem resistance was OprD porin loss and up regulated efflux.

### Measures Taken

The burns wards were closed to non-burns admissions. Patients were kept under strict isolation precautions throughout their stay and the patients with the greatest burn surface area in rooms with HINS lights. Water usage, environmental and hand hygiene audits of the burns ward were carried out. Water from the unit was tested for the presence of *P. aeruginosa*. Enhanced cleaning was implemented. The infection control nurses increased their visits to the wards to provide support. A review of recent prescribing on the intensive care unit was undertaken and finally a review was undertaken of the organisms isolated in major burns in this unit.

### Conclusions

There has been no further spread of the organism since the measures were implemented and enhanced surveillance remains in place.

This was a very serious outbreak but once recognized it was speedily brought under control by close and effective interaction by the infection control, surgical and intensive care teams although a single source was never identified.

## 237: Effective management of carbapenem-resistant *Acinetobacter baumannii* (CRAB) outbreak in a teaching hospital

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Carbapenem-resistant *Acinetobacter baumannii* (CRAB) presents a serious therapeutic and infection prevention and control challenge.

15 patients identified since November 2016, in specialities Diabetes, Renal, Vascular and splint workshop. All isolates were oxa 23/51 carbapenamase producer with same antibiogram. VNTR linked 10 out of the 15 patients to the same cluster. 3 had a unique phage type.

Environmental swabbing : All 46 swabs from renal unit were negative 1/20 from diabetic foot clinic only was positive for oxa 23/51 and VNTR phage type deri50ac-1 linked to the same cluster. 1/19 from endocrine ward identified CRAB

Environmental decontamination with hydrogen peroxide fogging was done on all areas. Disinfectant wipes and a cleaning regime has been introduced for equipment cleaning between patients in the diabetic foot clinic

Antimicrobial Stewardship: The use of carbapenem and quinolone was reviewed. Trust used below national average in April 2018 lowest in the region. However endocrine, renal & vascular wards had higher consumption

### Discussion

- To scrap a protocol of diabetic patients requiring angiogram / angioplasty needing transfer to vascular ward leading to potential contamination of multiple environments and increasing length of stay.
- To consider contacts tracing and patient screening.
- Terminal cleans in diabetic foot clinic to be prioritised via the helpdesk to prevent delays.
- Utilising diabetic foot MDT and board rounds to deliver key messages.
- The outbreak control group to continue surveillance and monitoring

## **254: The measles on the bus goes round and round: community and hospital infection control lessons from a small outbreak on Tyneside**

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<sup>1</sup>*North East Health Protection Team, Public Health England*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### BACKGROUND

Measles is an acute notifiable highly infectious viral disease. It is typically an unpleasant but mild illness, though complications such as severe pneumonia occur in up to 40% of cases. Measles has become rare in North East England in recent years, with a mean of four confirmed cases reported each year between 2014 and 2017 among the 2.5 million-strong population.

### OUTBREAK DESCRIPTION

In April 2018, a total of 15 confirmed cases of measles were reported in the North East, including 13 in the Tyneside area. The 13 were mostly young adults (median age 18 years). Eight were male. Most (n=9) did not have a documented full course of MMR vaccination prior to their illness.

### LESSONS FROM OUTBREAK

Eight cases presented to accident and emergency departments or walk-in centres operated by acute hospital Trusts.

One case was diagnosed with possible measles at a walk-in centre and advised to attend hospital for further assessment. The patient self-transferred by public bus. Two other travellers on the same bus route were later confirmed as cases. It is important that healthcare workers consider the mode of transfer for patients with suspected infectious diseases.

There was one case of patient to healthcare worker transmission in a hospital setting, and lookbacks to exclude nosocomial transmission were required for several other cases. Lessons included prompt isolation of patients with possible measles, correct use of personal protective equipment among staff regardless of vaccination status, and clear accessible occupational health documentation of staff vaccination or immunity status.

## 256: Outbreak of pneumococcal and influenza infection in a care home in the North East of England, January 2018

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

Care home settings provide an ideal environment for acquisition and spread of infection to susceptible residents. Influenza viruses are one of the most common causes of outbreaks of acute respiratory illness in care homes and when associated with secondary bacterial infection may result in more severe illness. We describe an outbreak of pneumococcal and influenza infection in a care home in the North East of England.

### Outbreak investigation

Care home staff are asked to report outbreaks of influenza like illness (ILI) to the Health Protection Team (HPT) who undertake a risk assessment and provide advice about microbiological testing, infection control measures and prophylaxis.

### Results

17 / 61 residents reported respiratory illness with onset between the 11th January -2nd February. Seven residents were hospitalised and there were two deaths. Four residents had confirmed influenza A infection and three invasive pneumococcal infection (two confirmed by urinary antigen and one confirmed in blood). All three had serotype three infection, which is vaccine preventable. The home was closed to admissions and discharges for a total of 22 days.

93% of residents had received seasonal influenza and pneumococcal vaccination. Pneumococcal vaccine had been administered on average 10 years ago. The home was found to be using an inappropriate cleaning product.

### Discussion

Respiratory outbreaks in closed settings can result in severe illness and have a substantial impact on healthcare services. This outbreak arose despite relatively high vaccine uptake and other infection control measures remain an important component of outbreak control.

## 259: 'Seek and ye shall find': an enterovirus outbreak on a Level 3 NICU

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<sup>1</sup>*Homerton University Hospital NHS Foundation Trust*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

In January 2018 a baby in an open cot on a Level 3 NICU using a vapour-dispensing medical device developed a florid rash on their face, arms, torso & legs. The baby could not be isolated in an incubator as they were too big and no side rooms were available on the unit as one side room was closed for building works and there was a CPE positive baby in the other side room. Contact precautions were put in place at the cotside and the room was closed to admissions and transfers. The 6 other babies in the room were placed in incubators to decrease exposure and monitored for signs of infection. Virology samples were sent on the index case and enterovirus was confirmed by viral PCR.

Two days later a second baby, in the neighbouring incubator to the index case, developed a minor rash on their wrist which was confirmed to be enterovirus on viral PCR testing. Two asymptomatic babies were discharged home.

After 9 days it was finally possible to move the remaining 4 babies to the two NICU side rooms and reopen the main room. Fourteen further days isolation was advised for the two asymptomatic babies.

Subsequently these two babies became symptomatic with minor respiratory symptoms and their NPAs were PCR positive for enterovirus. However, on reference lab typing, only the first, neighbouring baby's isolate was the same enteroviral strain as the index case, the other 2 babies had untypable strains and were most likely co-incidental results.

## 275: Outbreak of OXA-48-producing *Klebsiella pneumoniae* in the East Midlands

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Carbapenemase-producing *Enterobacteriaceae* (CPE) are being increasingly encountered in the United Kingdom. Here we report an outbreak of OXA-48-producing *K. pneumoniae* (OXAKp) involving two distinct strains of *K. pneumoniae*.

The discovery of OXAKp isolates in clinical samples of two patients with no identifiable risk factors for CPE acquisition led to widespread screening in the Trust. To date, over 500 patients across 29 wards have been screened using rectal swabs cultured on chromogenic agar. PCR (Cepheid) was performed on positive screening isolates to confirm carbapenemase production.

51 cases of OXAKp carriage were found across 13 wards. Screening also detected 11 cases of OXA-48-producing Gram-negative organisms other than *K. pneumoniae* and 4 cases of NDM-producing *Enterobacteriaceae*. VNTR typing of the *K. pneumoniae* isolates reveal two predominant strain types clustered around two distinct ward groups with the first strain type predominantly detected on the initial outbreak ward and the second strain type clustered around two other medical wards.

Infection control measures implemented during the outbreak include source isolation of affected patients, designation of the initial outbreak ward as an isolation ward and screening of contacts on three consecutive days. Affected wards were also decanted, deep cleaned and then decontaminated with 35% hydrogen peroxide vapour prior to being reopened. All wards with positive cases underwent weekly surveillance screening after the initial 3-day screen.

Six weeks after recognition of the first outbreak case, despite strenuous infection prevention efforts, new OXAKp cases continue to be identified, underlining the ready transmission of this pathogen.

## 55: Role of *Mycobacterium tuberculosis* post-translational regulatory protein in inhibiting autophagy by histone hypermethylation

**SENGUPTA S**<sup>1</sup>, Sonawane A<sup>2</sup>

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

*Mycobacterium tuberculosis* (Mtb) the causative agent for Tuberculosis, facilitates its persistence and evades host immune defences by executing various strategies. There are several Mtb proteins including cell wall-associated protein, secreted protein, which are involved in modulation of host immune defences. PRTP (Post-translational regulatory type protein), a hypothetical cell wall-associated Mtb protein is responsible for autophagy inhibition to facilitate intracellular survival. To understand the mechanism of autophagic inhibition by PRTP, the involvement of epigenetic modification was investigated. The dynamics of Histone hypermethylation in autophagy-related genes by Mtb-PRTP were studied in RAW macrophages. Western blotting showed that Mtb-PRTP increased H3K9me2/3 and H3K27me3 resulting in decreased Atg5, Atg7 expression and LC31/II conversion. Further investigation revealed that Mtb-PRTP increased methyltransferase, G9a expression and Ezh2 expression in macrophages. ChIP assay followed by Realtime-PCR analysis showed that PRTP mediates hyper-methylation of H3K9 but not H3K27 at the promoter of Atg5 and Atg7. Further, it was observed that PRTP inhibits H3K9me2/3 and up-regulates Atg5, Atg7 and LC31/II upon P38 inhibition and ROS activation, which shows that the process of autophagy inhibition by epigenetic modification is dependent on reduced ROS formation and activated P38-MAPK signalling. Chemical inhibition of G9a, upregulated autophagy and down-regulated H3K9me2/3, emphasizing the role of G9a and histone hypermethylation in autophagy inhibition. Overall, the results indicated that Mtb-PRTP epigenetically inhibited autophagy through repressing autophagy related genes. Therefore, the present study benefits in a better understanding of mycobacterial pathogenesis as it highlights the role of epigenetic modification and Mtb protein PRTP in mycobacterial infection, thus promoting virulence.

## 122: The inhibitory effects of cetylpyridinium chloride on urinary tract-associated pathogens

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Poster Talk 4 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Urinary tract infections (UTIs) are one of the most common hospital and community-acquired diseases in the UK. The re-occurrence of UTIs is not uncommon, with *E. coli* is the most isolated bacteria. Another organism possibly associated with UTIs is Acanthamoeba. It is well known that the multidrug-resistant bacterial strains possessing Extended-Spectrum  $\beta$ -lactamases (ESBLs) and Carbapenemase have become an increasing problem worldwide. A recent study has confirmed the presence of Acanthamoeba in urine samples collected from critically ill patients. Previous studies have also shown that pathogenic *E. coli* k1 can survive and multiply within Acanthamoeba which increased their virulence. Therefore, it is reasonable to hypothesise that Acanthamoeba possibly plays a role in recurrent UTIs (rUTIs). The treatment of such infections is problematic and looking for new medication is essential. Cetylpyridinium chloride (CPC) is an oral antimicrobial agent formulated within a concentration range of 0.05 and 0.10%.

The aim of the current project is to study the antimicrobial effects of CPC on ESBL positive (TEM and AmpC) and Carbapenemase (OXA-48) *E. coli* and Acanthamoeba.

This project showed the antimicrobial effects of CPC on ESBL and carbapenemase positive bacteria in concentrations of 10 $\mu$ g/ml and 18 $\mu$ g/ml respectively. A concentration of 15 $\mu$ g/ml has reduced the survival of OXA-48 inside Acanthamoeba and urothelial cell line. OXA-48 is the only strain survived and multiplied inside Acanthamoeba and the cell line, and this is may be due to it's virulence factors which lead to re-occurrence of UTI caused by this bacterium.

## 9: Investigation of a theatre acquired invasive Group A Streptococcal Infection: Does the surgical face mask have a role in protecting patients?

**Tobiss H<sup>1</sup>**, Joseph A<sup>1</sup>, Trigg D<sup>1</sup>, Clarke M<sup>1</sup>, Walton T<sup>1</sup>, Boswell T<sup>1</sup>, Mahida N<sup>1</sup>

<sup>1</sup>Nottingham University Hospitals Trust

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background:

Invasive Group A *Streptococcus* (iGAS) infection is associated with high morbidity and infections are sometimes linked to colonised healthcare workers (HCWs).

### Aim/Objective:

We report on the investigation of a healthcare-associated iGAS case.

### Methods:

A patient developed profound septicaemia with multi-organ failure within 24 hours of routine retroperitoneal laparoscopic nephrectomy. Immediate and repeated cross-sectional imaging failed to demonstrate an obvious post-surgical cause, but peritoneal cavity fluid cultured Group A *Streptococcus* (GAS). The infection control team undertook an investigation involving a retrospective review, prospective case finding and HCW screening involving a skin examination as well as throat and perineal swabs.

### Results:

No further patient GAS cases were detected on prospective and retrospective review. 7 of 8 HCWs present in theatre attended occupational health. Perineal swabs were negative and no skin lesions were seen. 2 HCWs, who were both asymptomatic, cultured GAS from throat swabs and received 10 days of penicillin V. Typing demonstrated one HCW had GAS emm 94.0, identical to the patient strain. The second HCW had a different strain of GAS.

### Discussion/Conclusion:

The HCW with GAS emm 94.0 had been coryzal at the time of surgery with an upper respiratory infection. Due to the laparoscopic procedure having a low risk of splashes, no HCWs wore a surgical face mask. This report highlights the question of whether wearing a surgical mask may have a role in stopping cross-transmission of droplet-spread organisms such as GAS. The patient made a full recovery but required a prolonged hospital stay, including ITU admission.

## 83: Translating surgical site infection policy into practice

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<sup>1</sup>*Guy's & St Thomas' Nhs Foundation Trust*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Clear, detailed healthcare governance policies in line with evidence based recommendations are available. However, most of these policies are never read in full. Organisations should therefore have systems in place to ensure key patient safety messages are disseminated to frontline staff. In light of this, our SSIS team worked closely with senior leadership to ensure key SSI policies were disseminated and implemented.

### Aims

We aimed to disseminate key messages from the National Institute of Health & Care Excellence (NICE) SSI quality standard and then develop and embed an SSI detailed investigation protocol within clinical governance structures.

### Methods

In 2014, we prepared SSI key messages in line with patient safety themes on improving quality, safety and efficiency from the Chief Executive office at the time. A minimum of 8 monthly newsletters covering all 7 quality statements, with clear accountability for different staff groups were disseminated from our Chief Nurse office. Additionally, the SSI team shared these newsletters, also published on Trust intranet pages, with frontline staff during clinical visits.

### Results

We successfully covered NICE SSI quality standard key messages, giving us a platform to develop and successfully implement a protocol for investigating SSIs. Staff SSI knowledge improved and feedback was positive. SSI rates continued to decline, e.g. superficial SSIs in adult cardiac fell from 19 in 2014 to 3 in 2015.

### Discussion

Incorporating key infection control and quality improvement messages, within organisational patient safety themes, coupled with separate campaigns may improve policy uptake and compliance.

## 84: Risk factors for SSI after open heart surgery

**Shinkai N<sup>1,2</sup>**, Morimoto T<sup>3</sup>, Yano H<sup>2</sup>, Koyama T<sup>4</sup>

<sup>1</sup>Kobe City Medical Center General Hospital, <sup>2</sup>Nagoya City University, Graduate School of Nursing, <sup>3</sup>Kobe City Medical Center General Hospital, Clinical Research Promotion Center, Department of Clinical Epidemiology, Hyogo College of Medicine, <sup>4</sup>Kobe City Medical Center General Hospital, Cardiovascular Surgery

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

A retrospective cohort study was conducted to evaluate risk factors for SSI after cardiovascular surgery in light of a bundle of SSI preventive measures. The study population was 1,579 patients who had received open heart surgeries at Kobe City Medical Center General Hospital from January 2008 to December 2010 (Period I when standard infection prevention measures were implemented) and from January 2014 to December 2016 (Period II : after a relocation of the hospital to a new campus and enhanced infection prevention measures were implemented). Overall SSI incidence was 4.5%. SSI incidence decreased significantly from 6.6% in Period I to 2.9% in Period II ( $p < 0.001$ ). Significant increase was observed in Period II in selection of appropriate antibiotics ( $p = 0.005$ ), discontinuation of prophylactic antibiotics within 48 hours after surgery and glucose control on post-operative Day 1 and 2 ( $p < 0.001$ ). A univariate analysis showed statistical significance in surgical procedure, surgical period, surgical duration, post-operative day 2 morning glucose level, administration of prophylactic antibiotics greater than 1 hour before incision. A logistic regression analysis identified followings as risk factors: multiple procedures (odds ratio 2.4; 95%CI 1.2-4.6), administration of prophylactic antibiotics greater than 1 hour before incision (odds ratio 1.7; 95%CI 1.01-2.9). Surgical period lowered SSI risk (Period II, odds ratio 0.39; 95%CI 0.22-0.67). The study demonstrated administration of prophylactic antibiotics within 1 hour before incision was particularly important for SSI prevention. Higher compliance with SSI bundle and special attention to higher-risk patients receiving multiple procedures were also warranted.

## 98: Do root cause analysis have a role in quality improvement? How best to approach them

Chiwera L<sup>1</sup>, Wigglesworth N<sup>1</sup>, Newshome W<sup>1</sup>

<sup>1</sup>*Guy's & St Thomas' Nhs Foundation Trust*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Background

Root cause analysis are important and common in healthcare organisations, however 'more education and training' is often the default outcome or action plan from most investigations. A human factors approach that enables genuine system or operational problems to be adequately addressed is desirable.

### Aims

We aimed to establish an effective surgical site infection (SSI) detailed investigation protocol, which enabled us to identify potential surgical pathway issues and measure compliance with evidence based SSI prevention recommendations from the National Institute of Health & Care Excellence (NICE).

### Methods

The infection control team drafted an SSI detailed investigation protocol in 2014, and sought input from the Trust SSI surveillance committee and surgical directorate leads. The protocol was then approved by relevant infection control committees. In line with this protocol, emails are send out to identified directorate SSI nursing and medical leads whenever patients develop deep / organ space infections or when SSI trends are going up. The matron coordinates investigations and any meetings. A directorate SSI lead shares and discusses outcomes from investigations at relevant clinical governance or morbidity and mortality meetings. An SSI detailed investigation log is now circulated monthly to surgical teams.

### Results

The SSI detailed investigation protocol is fully embedded within clinical governance structures and there is good surgeon and allied health care professional participation. Staff use outcomes of SSI investigations in quality improvement work.

### Discussion

Root cause analysis or IPC investigations are more productive when clinical staff take ownership and are involved in the development of relevant protocols.

## 126: Incidence and risk factors for surgical site infection after craniotomy

**Jimenez-Martinez E<sup>1</sup>**, Hornero A<sup>1</sup>, Ciercoles P<sup>1</sup>, Gabarros A<sup>1</sup>, Cabellos C<sup>1</sup>, Pelegrin I<sup>1</sup>, Garcia D<sup>1</sup>, Carratalà J<sup>1</sup>, Pujol M<sup>1</sup>, Cuervo G<sup>1</sup>

<sup>1</sup>University Hospital Of Bellvitge

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

**Introduction:** Surgical site infection after craniotomy (SSI-CRAN) is a serious complication. Although SSI-CRAN rates should be low (usually below 5%), its potential consequences are devastating given the high morbidity associated and the complex treatment required. We aimed to identify the risk factors (RF) for SSI-CRAN in a large prospective cohort of adult patients undergoing craniotomy.

**Methods and setting:** Retrospective analysis of prospectively collected data of all patients who underwent craniotomy procedure in a tertiary university hospital from January 2013 to December 2015. Patients were followed up to 1-year after surgery. Main outcome was SSI-CRAN according to CDC definition.

**Results:** Among 595 patients who underwent craniotomy 91 (15.3%) episodes of SSI-CRAN were diagnosed, 67 (73.6%) of them being organ/space surgical site infections. Demographic characteristics between both groups were similar. Among the aetiologies, *Propionibacterium acnes* (23.1%) and methicillin susceptible *Staphylococcus aureus* (23.1%) were the most frequent gram-positive microorganisms isolated, whereas *Enterobacter cloacae* (12.1%) was the gram-negative most isolated. Univariate analysis of factors associated with SSI-CRAN found ASA score >2 (35.5% vs 48.4%, p=0.025), extrinsic tumour (19.2 vs. 28.6, p=0.05) and reintervention (1.4 vs. 4.4, p<0.001) as those significantly associated with this complication. By multivariate analysis ASA score >2 (AOR: 2.26, 95% CI: 1.32–3.87; p=.003) and reintervention (AOR: 8.93, 95% CI: 5.33–14.96; p<0.001) were found to be independent RF for SSI-CRAN.

**Conclusion:** According to our study, ASA score >2 and reintervention were independent RF for SSI-CRAN. Of note, NISS score was not a useful predictor for developing a SSI-CRAN.

## **142: Can 2 become 1? Novel innovative approach and solution to address GIRFT and SSI using existing technology**

**Natarajan M<sup>1</sup>**, Lovell J<sup>1</sup>, Levison S<sup>1</sup>

<sup>1</sup>*Kettering General Hospital*

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Background: Surgical Site Infection (SSI) Surveillance by PHE and more recently Getting it Right First Time (GIRFT) forms key part of individual hospital and Surgeons outcome measures for Acute Trusts.

Aim: Quality of data input is challenging and it is important not to under or over-report true SSI. In KGH, we developed an innovative method using existing software (ICNET) to extract data from theatre and lab systems and now extended to cover most of the modules required by GIRFT to measure SSI rates.

Method: KGH Infection Prevention and Control team (IPC) use ICNET (web-based) on a daily basis to do alert organism surveillance.

Creating links: ICNET is linked to Microbiology lab results to extract positive Microbiology results on Surgical categories with selected codes and for selected time periods. ICNET is linked to patient information system and theatre software to extract denominators for each surgical category.

Creating list: A bespoke list extracting positive Microbiology results was created for each Surgery, including theatre details required for PHE surveillance and GIRFT. IPC Nurses use this list to analyse and discuss infections using bed-side laptops.

Validation: Information on all SSI (orthopaedic) is discussed at fortnightly Infection MDT, and SSI in other categories is checked with IPC, notes and Consultant in-charge to enable accurate reporting.

Conclusion: novel 2 for 1 methodology will help in accurate and timely reporting of SSI for PHE and GIRFT and highlight gaps in practice. Presentation to surgeon enable for QI projects to improve outcomes and patient experience.

## 166: Biofilm growth on orthopedic implantable materials: static or dynamic condition what is the most appropriate methodological tools to study device-related infections?

**Leonetti S**<sup>1</sup>, Tuvo B<sup>1</sup>, Totaro M<sup>1</sup>, Batoni G<sup>1</sup>, Lopalco P<sup>1</sup>, Privitera G<sup>1</sup>, Baggiani A<sup>1</sup>, Casini B<sup>1</sup>

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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Aim

Study of biofilm growth under static and dynamic conditions to evaluate the most suitable orthopedic materials on the prevention of device-related infections.

### Method

Biofilms of *Staphylococcus epidermidis* (ATCC 35984) *icaA* and *icaD* genes positive and *Pseudomonas aeruginosa* (DSM 939) were generated under static and dynamic conditions, adding the bacterial inocula on titanium, carbon, polycarbonate and carbon-peek coupons housed in flat bottom test tubes or in the CDC Biofilm Reactor (CBR) system respectively. Biofilm growth was evaluated by MTT assay after 48 hours.

### Results

Results of dynamic model showed a better capacity of *S.epidermidis* to grow with a rotation between 120-60 rpm on each tested materials (Mann-Whitney test, p-value < 0,05) than *P.aeruginosa*. Titanium was the material on which the bacterial strains adhered less, whereas carbon and polycarbonate allowed greatest adherence of *P.aeruginosa* (Mann-Whitney test, p-value < 0,05). Results of static model showed that both species grew on each materials without distinction (Kruskal-Wallis test, p-value 0,95). *S.epidermidis* growth was better also under static condition.

### Conclusions

the static model was not able to evaluate the different adhesion capacity of the strains to the materials, confirming the dynamic model is the most suitable tool for the study of orthopedic materials on the prevention of device-related infections.

This research was funded by the University of Pisa, PRA 2017\_18 Project

## **245: Challenges to avoidable surgical site infections; is implementation the answer?**

**Robinson J**<sup>1</sup>, Timmons S<sup>1</sup>, Tanner J<sup>1</sup>, Armstrong N<sup>2</sup>  
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Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

### Introduction

Care bundles are designed to prevent surgical site infections (SSIs). Despite this, SSIs continue to be the biggest cause of healthcare associated infection. There are suggested strategies for implementing care bundles, however, there is limited research around the barriers and facilitators for implementing care bundles for preventing SSIs.

### Methods

This literature review explored the implementation of care bundles using the following databases; Cochrane Library, Medline, CINAHL, EMBASE and British Nursing Index. Key word descriptors include; care bundles, infection prevention and control, surgical site infections, implementation and implementation strategies.

### Results and Discussion

Implementation strategies that promote reliable use of care bundles in hospitals focus around educating, motivating and engaging staff, providing prompts for behaviour, ensuring equipment is readily available, staff engagement, staff ownership, recruiting local champions, perceived sustainability from stakeholders and senior leadership support. Early involvement and commitment from all staff at all levels during implementation increases the likelihood of success. These are not used consistently for the implementation of care bundles for preventing surgical site infections. Organisational level strategies, culture, evaluation and leadership needs consideration when looking at strategies to implement care bundles and it is vital to engage front line clinical staff as drivers for change along with dedicated staff to facilitate implementation. Despite recognised implementation strategies, there are huge variations with compliance of care bundles. There needs to be an evidence-based approach to implementation with a focus around the assessment of the barriers and challenges to implementation.

## **282: Preoperative screening for Meticillin-susceptible *Staphylococcus aureus* (MSSA) and nasal decolonisation in patients undergoing elective orthopaedic surgery.**

**Chan G<sup>1</sup>**, Schaffer K<sup>1,2</sup>

<sup>1</sup>St. Vincent's University Hospital, <sup>2</sup>University College Dublin School of Medicine

Poster Talk 3 (Mon 26 Nov 17:15 - 18:15), Exhibition Hall

Eradication of *S. aureus* carriage using mupirocin intranasally and chlorhexidine (CHG) body washes have been shown to reduce surgical site infections (SSI).

MSSA nasal screening was introduced in April 2016 for patients attending orthopaedic pre-assessment clinics in addition to MRSA screening in our hospital.

Patients colonised with MSSA receive mupirocin intranasally for 5 days preoperatively and are re-screened upon hospital admission. All patients receive 2 CHG baths preoperatively and perioperative antimicrobial prophylaxis.

We performed a retrospective audit on MSSA screening, decolonisation and SSI for patients undergoing elective orthopaedic surgery from January 2016 to December 2017.

Of the 547 patients, 66.9% and 32.5% underwent total hip replacement and total knee replacement respectively.

19% of patients were MSSA colonised. 95% were successfully decolonised in 2016. A lower success rate of 85% in 2017 was accounted for by 5 patients who had no repeat screening performed to document clearance of MSSA when admitted to hospital.

7 patients had an initial negative MSSA screen at pre-assessment but were positive for MSSA on repeat screening upon admission for surgery.

The SSI rate in 2016 was 0.4%. This was attributed by 1 case of a superficial MSSA infection who had not been screened for MSSA before the implementation of the screening programme. There were zero SSI in 2017.

No mupirocin resistance was detected.

Conclusion:

MSSA nasal screening and targeted decolonisation may have some value in improving SSI rates.

False negative MSSA screens are infrequent. PCR-base methodology and universal decolonisation may have a role in the future.

## 15: Decreasing prevalence of healthcare-associated infections and increasing antimicrobial use in hospitals in the Netherlands from 2007-2016

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: Prevalence of Healthcare Associated Infections (HAI) and antimicrobial use in hospitals in the Netherlands has been measured using voluntary biannual national Point Prevalence Surveys (PPS) since 2007. This study investigates trends in Dutch prevalence of HAI, risk factors and antibiotic use from 2007-2016.

Materials/methods: In the PPS, patient characteristics, use of medical devices, use of antibiotics, and presence of HAI on the survey day are reported for all patients in the hospital, except for patients in the day-care unit and psychiatric wards. Logistic regression analyses were performed to study trends.

Results: During 10 years, data was reported for 163,340 patients in almost 70% of the hospitals. Annual prevalence of HAI with onset during hospitalization decreased from 7.0% (95%CI: 6.6%-7.5%) in 2007 to 3.2% (95%CI: 2.9%-3.4%) in 2013 and ended at 4.2% (95%CI: 3.7%-4.7%) in 2016. Most prominent trends were seen for surgical site infections (1.6% to 0.7%, OR: 0.31 (95%CI 0.26-0.38)), urinary tract infections (2.1% to 0.6%, OR: 0.18 (95%CI 0.15-0.22)) and combined other infections (0.7% to 0.4%, OR: 0.26 (95%CI 0.19-0.35)). Over the years, the distribution of gender, age and McCabe-score remained stable. The median length of stay (LOS) decreased from 5 to 4 days. The percentage of patients treated with antibiotics increased from 31% to 38% (OR for trend: 0.76, 95% CI: 0.73-0.79).

Conclusions: Repeated PPS-data from 2007-2016 show a decrease in the prevalence of HAI with onset during hospitalization. Meanwhile, the percentage of patients with antibiotic use increased and the median LOS decreased.

## 20: Spatiotemporal epidemiology of Hepatitis C virus infection in Libya in ten years Period; 2007-2016

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### **Daw M<sup>1</sup>**

<sup>1</sup>*Tripoli University , Libya*

Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: Hepatitis C virus infection has been considered to be a hidden pandemic and It varies from one region to another particularly in Africa. The macroscopic geospatial analysis has become an important tool in identifying the density and clustering of HCV infection. The application of these parameters allow a better knowledge of the hepatitis C virus infection prevalence at national level and can help to implement pertinent strategies to address the HCV related burdens. This study aims to determine;1-Geographical variability of HCV infection in Libya and identifying the hot spots within regions and districts of the country.2- Population demographic determinants and outlining the interventions programs needed.

Methods: Disease mapping and spatial analysis were conducted using a geographic information data available on all documented cases of HCV infections in Libya between 2007-2016. Spatial autocorrelation was tested using Moran's Index which determines and measures the degree of clustering and dispersion of HCV infection in the country.

Results: A total 114928 HCV infection cases with accurate geographic information were studied in ten year period. Aged between (16-50year) with male; female ratio (2;1 ).HCV infection was found to be randomly distributed in Libya with steady increase over the study period. Several hot spots and cold spots were found concentrated mainly in Southern and Eastern regions of the country.

Conclusion: HCV infection in Libya was geographically variable with an increasing number of hot spots particularly in East and south region of Libya associated with different demographic determinants. Future intervention planning should consider the geospatial variability and risk factors involved.

## 27: Spatiotemporal distribution and demographic analysis of HIV infection in Libya in twenty five years period (1993-2017)

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### **Daw M<sup>1</sup>**

<sup>1</sup>Tripoli University, Libya

Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background; Despite the upsurge of HIV/AIDS in Northern African region, specific data on the HIV epidemic within each country including Libya is lacking. This study aims; 1-To analyze the epidemiological and spatial-temporal distributions of HIV among Libyan population within twenty-five years period (1993-2017). 2-To highlight the needed policy for HIV prevention and treatment.

Methods; A total of 8015 HIV cases of Libyan patients aged between 15-35 years with complete spatiotemporal epidemiological information were analyzed and spatial autocorrelation were performed using Spatial Scan Statistics programs to identify geographical location with disproportionate increase in HIV prevalence in the country.

Results; The proportion of HIV cases in Libya increased during the study period (1; 4) with increased number of new hotspots over years. Intravenous Drug Users (IVDUs) (67%) evolved as main route of transmission particularly in the last ten years. Geographical variation of HIV was evident. The highest proportion was reported in East region during 1993-2002, in South region (2003-2012) and in Middle and West mountain regions (2013-2017). A significant clusters of HIV positive cases were identified in two different time-periods, the largest one was in the last five years within the Middle region.

Conclusion; Despite the low prevalence of HIV among Libyan population it has great geographic variation with an uprising prevalence among the young Libyans associated with IVDUs. Hence then Specific strategies of monitoring should consider definable geographical areas and comprehensive behavioral interventions.

### **33: Hand hygiene as a “gold standard” of infection control program in the neuro-ICU**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Healthcare-associated infections (HAIs) negatively influence patients' outcomes by increasing the length of stay, healthcare cost, and lethality. The economic burden of HAIs in Russia is estimated at \$160-200 million per year. Broadly recognized that hand hygiene is an essential part of the infection control and prevention (IPC). A study goal was to demonstrate the correlation between the hand hygiene compliance and the rate of HAIs in the neuro-ICU.

**Methods.** A prospective observational study lasted for eight years (2011-2017) and included 2,607 patients staying in the neuro-ICU for >48 hours. The case of HAI was defined based on a 2008 CDC guideline. The IPC program was implemented in this ICU in 2010. The hand hygiene compliance was studied by video recording. The measures to improve compliance included education, motivational challenges, skill-training sessions, support, and promotions.

**Results.** The rate of CNS infections decreased from a high of 15.8% (95% CI 13.8-17.8) in 2011 to 8% (95% CI 6.7-9.3) in 2017. The rate of bloodstream HAI decreased from 6.3% (95% CI 5-7.6) in 2011 to 3.4% (95% CI 2.6-4.2) in 2017. The rate of VAP had a declining tendency: it dropped from 34.3% (95% CI 29.2-39.4) in 2011 to 25.9% (95% CI 21.8-30.1) in 2017. The adherence to hand hygiene among the neuro-ICU staff significantly increased from 27% in 2011 to 81% in 2017.

**Conclusion.** Our results demonstrate a strong negative correlation (Pearson's coefficient = -0.84) between the hand hygiene compliance and the rate of HAIs in the neuro-ICU during the eight-year study.

## **37: Core genome MLST reveals a more differentiated transmission than MLST in a rise of vancomycin resistant *Enterococcus faecium* in a University Hospital**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

In the Region of Southern Denmark, vancomycin resistant *Enterococcus faecium* (VREfm) was only detected sporadic until the mid of 2016, when a slow but certain rise in number of detected cases appeared in a University Hospital.

Both Multi Locus Sequence Typing (MLST) and core genome MLST (cg-MLST) based on Whole Genome Sequencing (WGS) was carried out for tracing transmission and assessing the usefulness of the methods as tools for epidemiologic use.

### Materials/methods

One isolate of VREfm from each of 38 patients in the hospital in the period January 2014 to June 2017 was included in the study.

Whole genome sequences were established using a MiSeq Instrument and analyzed with SeqSphere software generating MLST, cg-MLST, cluster arrangement and phylogeny.

Epi-curves of MLST types and cg-MLST groups were also constructed by SeqSphere.

### Results

MLST analysis showed that the 38 isolates belonged to six different sequence-types (STs) with 26 of the isolates being ST-80.

Cg-MLST analysis revealed however that the ST-80 isolates could be subdivided into seven different complex-types (CTs) and a group of five isolates with no assigned complex-type. The dominating CT-993 consisted of 12 of the ST-80 isolates, and the epi-curve based on cg-MLST and ward connection indicated that this complex-type was transmitted between patients.

### Conclusion

Compared to MLST the higher resolution of cg-MLST allowed a more detailed interpretation with evidence of transmission of specific CTs.

Cg-MLST may prove to be a valuable tool in infection control but both MLST and cg-MLST have to be supplemented with admission history.

## 40: Whole genome sequencing of toxigenic *C. difficile* in asymptomatic carriers: insights into possible role in transmission

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

Estimates of the prevalence of asymptomatically carried *C. difficile* in elderly patients in long-term care facilities ranges from 0-51%. Asymptomatic carriage is a known risk-factor for the development of infection, and there is ongoing debate surrounding the role of asymptomatic carriage in transmission.

### Aim:

To investigate the prevalence of asymptomatic *C. difficile* carriage amongst patients residing in a community hospital setting and to investigate whether asymptomatically carried *C. difficile* strains contribute to nosocomial CDI.

### Methods:

Stools were collected from as many eligible asymptomatic patients as possible in the included wards, and from symptomatic patients in the community. All samples were cultured for *C. difficile* and resulting colonies processed through whole genome sequencing.

### Findings:

151 asymptomatic patients were sampled, 22 of which were positive for *C. difficile* through culture, representing a carriage rate of 14.6%. Sequencing of these isolates, alongside 14 *C. difficile* PCR and culture-positive isolates from symptomatic individuals, revealed that all asymptomatic patients were carrying toxigenic *C. difficile*, and that these strains were genetically similar to those from symptomatic patients.

### Conclusion:

This small study of asymptomatic carriage of *C. difficile* has revealed a rectal asymptomatic carriage rate of 14.6% in patients nursed in a community hospital setting, and a high level of genetic similarity of these strains to those recovered from symptomatic patients. Consequently, we feel that asymptomatic carriers might be important for the transmission of symptomatic CDI, although we acknowledge that there are many other factors which govern whether *C. difficile* is carried asymptomatically, or causes symptoms.

## 47: Patients at risk of invasive extraintestinal pathogenic *Escherichia coli* disease: a systematic literature review

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Extraintestinal pathogenic *Escherichia coli* (ExPEC) is an important cause of mortality globally. Prevention of invasive ExPEC disease (IED) requires an understanding of its epidemiology. This study aimed to identify patient subsets at increased risk of IED.

We systematically searched the literature (Embase, LILACS, Pubmed, SciELO) for IED studies among adults (January, 2007-March, 2018) using search terms for *E. coli* and invasive infections. Identification of patients at increased risk for IED, specifically *E. coli* bloodstream infections (EcBSI), was based on the proportional contribution of different primary sites of infection to EcBSI, the incidence of EcBSI in specific settings, and the relative contribution of *E. coli* to BSI of all causes in specific patient subsets.

Overall, 77 studies were included. The most common primary source for EcBSI was urogenital (31%-80%, n=28 [no. of studies]), especially among women (1.3-1.5-fold > men, n=3). Incidence of EcBSI was highest in association with hematological malignancy with chemotherapy (0.1%-13%, n=6), solid organ transplant (0.3%-8%, n=12), stem cell transplant (1%-7%, n=4), and prostate biopsy (0.5%-1.5%, n=5). The relative contribution of *E. coli* to BSI was 25% overall and highest with prostate biopsy (58%-100%, n=5), transplant (2%-69%, n=18), hematological malignancies (9%-46%, n=12), and liver cirrhosis (12%-42%, n=11).

This systematic review supports that patients with IED, specifically EcBSI, most commonly have a urogenital primary site of infection. At highest risk for EcBSI were patients undergoing prostate biopsy or with immunocompromise or malignancy. Additional research is needed to better define high-risk groups for IED.

## **52: Electronic surveillance of healthcare-associated infections (HAIs) and antibiotic use - a tool in the infection prevention work**

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In order to replace manual registration, the Regional Health Authority of Central Norway, which comprises 7 hospitals, has developed an electronic surveillance tool for HAIs and antibiotic use. In Norway, all hospitals are required to carry out two prevalence registrations annually. UTIs, BSIs, LRTIs and SSIs are monitored. The results are published on helsenorge.no (the public health portal in Norway) as a quality indicator for hospitals.

In November 2017 all hospitals in the region had the tool installed. It provides valid real-time data harvested from patient data systems, such as hospital population, clinical specialty, age, gender. A passive support function for HAIs and antibiotics has been made available. The surveillance is based on the ECDC case definitions. Statistics are available at all levels in the organization immediately after registration. The tool communicates with the health authorities so that the statutory reports are easily taken care of.

Registration is done locally by the attending physician. IPC personnel have acknowledged that their role here is to facilitate the registration work. The results belong to the departments and clinics, and provide a trend overview of their own HAIs and consumption of antibiotics. The results may be used by managers, clinicians and IPC personnel to improve IPC work and contribute to increased patient safety. Point prevalence measurements provide only snapshots, but trend data may help determine what is important to improve. It is thereby emphasized that the responsibility for the HAIs and the use of antibiotics lies where the infections occur: in the departments.

## 60: Microbiological surveillance of operation theatres of Lunglei Civil Hospital: Mizoram-Northeastern part of India, from 2016 to 2018

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<sup>1</sup>Lunglei Civil Hospital, <sup>2</sup>District Hospital Champhai

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**Background:** Healthcare-associated infections are important cause of patient morbidity and mortality. Infection control and basic hygiene should be at the heart of good hospital management. So this study is conducted to determine the level of bacterial and fungal contamination of air, surfaces and disinfectants in Operation Theatres (OTs) of Lunglei Civil Hospital, Mizoram for a period of three years from May 2016 to April 2018.

**Methods:** Settle plate method was used for air samples, before and after fumigation with formaldehyde vapour. Swabs taken from surfaces like operation table were processed according to standard recommended method and In-use test was employed for disinfectants.

**Results:** Twenty(20) bacterial species and one(1) fungus were isolated from the air of OTs before fumigation. The most frequently isolated pathogenic bacteria was Methicillin-resistant *Staphylococcus aureus* (MRSA)(47.61%) followed by *Klebsiella* spp.(23.8%), Coagulase negative Staphylococci (CONS)(19.04%) and the least being *Enterococcus* spp.(4.76%) and *Candida* spp.(4.76%). MRSA was isolated once after fumigation. Swabs taken operation table showed the growth of MRSA once before fumigation and showed no growth after fumigation. The disinfectants used for disinfecting instruments in OTs showed no growth using In-use test during the study period.

**Conclusion:** This finding demonstrate that the microbiological quality of air, surfaces and disinfectants in OTs may be considered a mirror image of the hygienic conditions of the OTs. Settle plate method for air, swabbing technique for surfaces and In-use test for disinfectants proved to be valuable in detecting the contamination level in our set-up with limited resources.

## **62: Evaluation of a national observational hand hygiene auditing campaign to improve hand hygiene in Ireland. A retrospective time series analysis, 2009 - 2016**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

Observational hand hygiene auditing (OHHA) is a key component of the World Health Organization multimodal strategy to improve hand hygiene compliance. OHHA was implemented in Ireland in 2011.

### Aim:

The aim of this study was to evaluate the impact of OHHA on the national rate of observed hand hygiene compliance, alcohol based hand rub (ABHR) procurement and the incidence of sensitive and resistant *Staphylococcus aureus*, *Enterococcus faecium* and vancomycin resistant *Enterococci* bloodstream infections (BSI).

### Methods:

A retrospective interrupted time series analysis from an eight-year period (2009 to 2016), was performed to determine the temporal association between the implementation of OHHA and outcomes.

### Findings:

Observed hand hygiene improved from 74.7% (73.7, 75.6) in 2011 to 90.8% (90.1, 91.3) in 2016. ABHR procurement increased from 20.1L / 1,000 bed days used in 2009 to 33.2L / 1,000 bed days used in 2016. A pre-intervention reduction of 2% per quarter in methicillin sensitive *Staphylococcus aureus* BSI stabilised in the time period after the intervention, ( $p < 0.001$ ). Methicillin resistant *Staphylococcus aureus* BSI was decreasing by 4% per quarter pre-intervention, this slowed to 2% per quarter post intervention, ( $p = 0.09$ ). There was a non-significant increase in sensitive *Enterococcus faecium* BSI post intervention, ( $p = 0.21$ ) and no change in the occurrence of vancomycin resistant *Enterococci* BSI ( $p = 0.77$ ).

### Conclusion:

This study shows that national OHHA has increased observed hand hygiene compliance and ABHR procurement however, this alone does not translate to improvement in BSI outcomes.

## **72: Estimating the prevalence of *Clostridium difficile* infection (CDI) and MRSA bacteraemia in Care Homes in the East of England April 2017- March 2018**

**Millership S<sup>1</sup>**

<sup>1</sup>Public Health England

Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background:

Care homes are often perceived as a significant contributor to health care associated infections. We therefore reviewed data collected through national mandatory surveillance systems in the East of England to examine this issue.

### Aims:

- To determine the incidence and prevalence of *Clostridium difficile* infections (CDI) and Methicillin Resistant *Staphylococcus aureus* (MRSA) bacteraemia cases associated with care homes in East of England - April 2017-March 2018

### Methods:

A dataset of community apportioned cases attributed to care homes was created using data from the mandatory HCAI Data Capture System (HDCS), the Public Health England Second Generation Surveillance System (SGSS) and the postcode of residence of the case. SGSS data was also used to identify previous CDI episodes. Care home population was estimated from Office for National Statistics (ONS) data.

### Results:

57% (530) of the total CDI cases (922) were community apportioned. 10.6% (56) originated from care home settings. 26% (15) of these had a previous CDI episode and 73% (41) were new cases. Annual prevalence of CDI was 1.8 and incidence 1.4 per 1000 population.

Of the 75 MRSA BSI, 64% (48) were community apportioned. Of these only 7% (14) originated from care home settings. The annual prevalence of MRSA BSI in care homes was 0.2 per 1000.

No care home clusters of CDI or MRSA were identified.

### Conclusions:

Care homes are small contributor to community CDI and MRSA BSI.

### Recommendations:

The origin of the remaining community apportioned CDI and MRSA cases need further investigation.

## **73: What are the risk factors for acquisition of vancomycin resistant enterococci amongst inpatients in the West of Scotland Renal Unit?**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Vancomycin resistant enterococci (VRE) are a problem for healthcare settings. Their increased resistance to antibiotics results in exposure of patients to more expensive and more toxic antibiotics. Furthermore there may be a delay before receipt of the correct antibiotic. This delay is known to translate into an increase in mortality. Outbreaks have been reported in various settings such as intensive care departments and renal units across the world.

This retrospective case control study was conducted following an outbreak of VRE in the West of Scotland Renal Unit in 2012. The aim was to assess local risk factors associated with acquisition of VRE in order to target future interventions of the infection control team.

Variables which were found to be statistically significantly associated with acquisition of VRE were mean duration of inpatient stay over the preceding six months, total number of antibiotics to which the patient was exposed over the preceding six months and exposure, in particular, to the antibiotics ciprofloxacin and piperacillin-tazobactam. While the study is limited by its small sample size the findings are of interest and worthy of further discussion.

The importance of piperacillin-tazobactam exposure is important as this agent has been increasingly used locally. This highlights the importance of antimicrobial stewardship, the focus of which needs to be constantly adapting to local circumstances. Additionally, similarly to previous studies, the importance of length of stay has been emphasised. It is likely that the team's focus on environmental cleaning had an impact in bringing this outbreak to close.

## 95: Reproducibility of three mortality review measures to assess the contribution of healthcare-associated infections to mortality

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** The contribution of healthcare-associated infections (HAIs) to mortality can be estimated using statistical methods, but mortality review (MR) is more suited for routine use in clinical settings. The European Centre for Disease Prevention and Control (ECDC) recently introduced MR in EU surveillance of HAIs.

**Objective:** Evaluation of the reproducibility of three measures for MR.

**Methods:** Two physicians, including the clinician in charge, independently reviewed the records of deceased patients with bloodstream infection (BSI), pneumonia, *Clostridium difficile* infection (CDI) or surgical site infection (SSI), and assessed the contribution of these infections to death using three measures:

- Definitely/Possibly/No contribution to death (3CAT);
- Sole cause/Part of causal sequence but not sufficient on its own/Contributory cause but unrelated to condition causing death/No contribution to death, based on WHO's death certificate (WHOCAT);
- Likert scale from 0 (No contribution) to 10 (Definitely cause of death) (QUANT).

Interrater reliability was assessed with weighted kappa and with intra-cluster correlation coefficient (ICC) for QUANT. Reviewers rated the fit of the measures to each case.

**Results:** Twenty-four hospitals participated and 291 cases were reviewed: BSI (29.9%), pneumonia (38.8%), CDI (24.4%) and SSI (6.9%). The results were:

- 3CAT: kappa 0.68 (95% confidence interval 0.61-0.75);
- WHOCAT: kappa 0.63 (0.55-0.72);
- QUANT: ICC 0.52 (0.37-0.65).

Interrater reliability was the highest for pneumonia and SSI. All three measures fitted 'reasonably' or 'well' in >88% of the cases.

**Conclusion(s):** Reproducibility of the three MR measures was acceptable for use in HAI surveillance, but depended on the type of infection.

## **97: A prospective, observational study reveals Hospital Acquired Pneumonia (HAP) to be a blind-treated, high mortality, hospital-wide disease associated with cardio-respiratory comorbidity**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

Pneumonia (HAP) is the highest mortality, most frequent UK hospital acquired infection. However, there is little evidence to support management of the majority of cases which occur outside the Intensive Care Unit. We developed a surveillance system and describe HAP, its management and outcomes in a large UK hospital.

### Methods

We prospectively recruited all patients with HAP at a large UK Hospital during October 2017. A 3 stage screening process involved 1) daily surveillance of hospital-wide electronic antibiotic prescribing 2) radiological cross-referencing and 3) same day clinical confirmation of HAP cases from whom anonymised data were collected.

### Results

97 cases were distributed across all hospital wards but concentrated on respiratory 27.8%, surgical 17.5% and care of the elderly 13.4% wards. Age ranged from 31y to 98y with a median of 77y. The most frequent comorbidities were cardio-respiratory (44.3%). Only 27/97 (27.84%) patients had a sputum sample sent of which 5/27 (18.5%) were positive. Blood cultures were sent in 42/97 (43.30%) of which 6/42 (14.3%) were positive. Antibiotic choice was guideline compliant in 78.4% but treatment duration was compliant in only 33%. Median length of stay was 18 days. 1 month mortality was 24.7%, rising to 46.4% at 6 months and 50.5% at 9 months.

### Discussion

HAP affected the whole hospital and was associated with high short and long-term mortality. Antibiotic choice was always empirical and rarely supported by microbiology. Duration of treatment varied enormously. We demonstrate an effective method of HAP surveillance to aid quality improvement and facilitate research.

## **114: *Escherichia coli* bloodstream infection related to urinary tract infection associated with community-acquired pneumonia in elderly patients in Central Lancashire**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: *Escherichia coli* bloodstream infections (BSIs) continue to increase worldwide. There is a national ambition to reduce healthcare associated Gram-negative BSIs.

Aim: To understand the characteristics *E. coli* BSIs related to urinary tract infection (UTI) in Central Lancashire.

Methods: Retrospective reviews of *E. coli* BSIs reported during 4 months (October 2017, January, April and May 2018) were performed. Data were extracted from the laboratory information system, infection prevention control information system and electronic patient records.

Results: There were 109 *E. coli* BSIs. The mean age was 71.9 years (range 21-98 years) and 60/109 (55%) were male. UTI-related *E. coli* BSIs comprised 61/109 (56%) with a mean age of 72.6 years (range 21-95 years) and 33/61 (54%) occurred in females. The UTI-related *E. coli* BSIs comprised a diverse range of clinical characteristics including pyelonephritis without any urinary tract abnormality, which were the majority; transplant pyelonephritis; urological malignancy; nephrostomy-associated infection; post childbirth. 8/61 (13%) were catheter-associated UTI (CAUTI), representing 7% of the *E. coli* BSIs. 15/61 (25%) patients with UTI-related *E. coli* BSI had community-acquired pneumonia which had developed before the *E. coli* BSI. The mean age of these patients was 82.0 years (range 66-91 years) and 9/15 (60%) were females with pyelonephritis.

Conclusions: *E. coli* BSI related to UTI may be associated with community-acquired pneumonia. Surveillance methods which capture the single most likely cause of *E. coli* BSI will not identify other contributing factors. Reducing CAUTI will have a small impact on the incidence of *E. coli* BSI in Central Lancashire.

## **117: Challenges of carbapenemase-producing *Enterobacteriaceae* (CPE) in haemodialysis patients**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

CPE is an increasing global threat and impacts on health care delivery. Evidence suggests that dialysis-dependence is a risk factor for CPE transmission, however there is paucity of data regarding managing of CPE patients in specialist areas who are in regular contact with health-care

### Aims and Objectives

There are 4 haemodialysis units in our area serving 425 patients. We aim to share our experience of CPE management in haemodialysis patients and discuss the challenges posed in terms of Infection, prevention and control (IPC) resources

### Method

Following the CPE Toolkit, a holiday CPE screening programme was introduced in 2014 for haemodialysis patients. All patients with dialysis abroad are placed in isolation until 3 screens are negative. CPE patients are isolated and IPC precautions initiated with a cleaning programme

### Results

Since January 2015 to June 2018, 130 patients have had holiday dialysis; five returners from dialysis abroad screened positive. Two further patients had CPE isolated. Their epidemiology will be discussed. There were no positive cases in 2015 and one in 2016, illustrating an increase since 2017. Our current prevalence is 1.6%. One out of 7 positives had infection with CPE. We attempted serial screens for clearance in one patient but relapse happened after 12 months.

### Conclusion

As we get more CPE patients their management due to the demand on isolation facilities and provision of high quality cleaning is increasingly becoming a challenge. There is lack of evidence for re-screening to decide on clearance and cohorting of positive patients

## **118: Perils and Pitfalls of Evaluating the Cost of Nosocomial Infection (ECONI): Incidence survey of HAI with nested case control evaluating cost and quality of life**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Healthcare-associated infections are known to cause patients distress, often delaying their recovery and in some cases resulting in long term consequences. One of the challenges for infection prevention and control (IPC) practitioners is to fully evaluate the impact of those infections. The impact can include; additional length of stay, cost of treatment in hospital, morbidity, mortality, effect on quality of life, effect on ability to work, use of primary care post discharge, requirements for social care and consequences for family members and carers.

It is now over 20 years since the Plowman study reported on the Socioeconomic impact of HAI and this remains a key reference for IPC practitioners and policy makers. The ECONI study will undertake incidence surveillance of HAI in two Scottish Hospitals for one year. All adult patients admitted overnight will be included. There will be a nested case comparator study where patients who are able to provide consent will answer a patient reported questionnaire on quality of life, these patients will also undergo a detailed case note review which will record antimicrobial use, AMR screening results, device use and risk factors for HAI including surgery. These patients will complete questionnaires post discharge for up to one year post discharge. Linkage to routine datasets will provide information on an admission cohort.

We will report the methods used in the study and the challenges faced in designing a complex nested study. We will report the main issues arising and describe the planned outputs from the study.

## **121: Point prevalence survey of carbapenemase-producing *Enterobacteriaceae* (CPE) and vancomycin-resistant *Enterococci* (VRE) in adult inpatients in a University teaching hospital in the United Kingdom**

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### Background

Infections with carbapenemase-producing *Enterobacteriaceae* (CPE) and vancomycin-resistant *Enterococci* (VRE) are associated with increased morbidity and mortality, but the carriage rates of CRE and VRE among hospital inpatients is unknown.

### Methods

We conducted a 3 day point-prevalence survey in June 2017 to determine CPE and VRE carriage rates in hospitalised adults. All adult inpatients were screened for CPE and VRE carriage, and asked questions about risk factors for CPE. Rectal swabs or stool samples were collected and cultured on CPE and VRE selective media. Isolates were identified using MALDI TOF MS, and underwent Vitek antimicrobial susceptibility testing. Potential CPE isolates were confirmed using the Xpert® Carba-R assay.

### Results

818/960 (85.2%) adult inpatients were invited to participate in the study. 595/818 (72.7%) consented and provided specimens. In terms of risk factors for CPE, 318/509 (62.5%) patients had attended a UK hospital in the previous 12 months, 179/509 (35.2%) patients had been previously admitted to our hospital, 4/509 (0.78%) had been admitted to a London hospital, and 3/509 (0.6%) had been hospitalized abroad. Of 540 samples tested, none were positive for CPE. 130/540 (24.1%) samples were VRE positive and 34/40 (85%) of wards had VRE cases.

### Conclusions

We found no cases of CPE carriage in adult inpatients, justifying continuation of a risk-based screening approach. However we found high rates of VRE carriage in adult inpatients. The optimal screening strategy for VRE is unknown, as universal screening and isolation is not feasible in our setting.

## **124: Validation of surgical site infection surveillance system data in São Paulo State, Brazil: development of a protocol**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: validation of surveillance system data of surgical site infection (SSI) ensures the quality of the information. Objective: to develop and to pilot a protocol to validate data of SSI reported to surveillance system of the State of São Paulo, Brazil. Methods: study performed from February-2014 to January-2018 in three phases: systematic literature review of strategies used by governmental surveillance systems to validate SSI data; development of a protocol to validate the SSI data reported to surveillance system; conducting a pilot study in a selected region of state. Results: the literature review showed that there is no standard method used to validate the SSI data of surveillance systems at governmental level. Through this review, we identified strategies and elements suitable to be included in our protocol for SSI data validation, which encompasses description of steps for planning and performing the process, staff requirements, sampling formula, data collection tool and methods for data analysis. The protocol was piloted in five hospitals by reviewing a randomized sampling of 168 medical records from patients submitted to selected procedures. The mean time to perform data validation for each medical record was 15 minutes. Discrepancies between data found by researchers and those reported in the surveillance system related to both denominators and numerators. Five cases were misclassified as SSI despite no evidence fitting in the criteria for diagnosis. Conclusions: the protocol showed to be feasible and pointed out needs for improvement in the SSI surveillance system.

## 131: Survey of nosocomial influenza in South-western Swiss hospitals during two seasonal epidemics

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Nosocomial influenza increases morbidity and mortality in hospitalised patients. No multicentre study analysed its impact in Swiss hospitals yet.

This study was conducted from november 1st to April 30th in 2016-2017 and 2017-2018 in 27 acute-care public hospitals in South-western Switzerland. It aimed at describing nosocomial cases of seasonal influenza. During these 2 time-periods, every patient hospitalized for >72 hours that was positively screened by RT-PCR or antigen detection for influenza was retrospectively included in the survey. Policies to prevent influenza were collected in each participating hospital. Characteristics of patients included age, sex, and comorbidities. Included patients were followed-up until discharge or death. Complications and administration of anti-neuraminidases and/or antibiotics were registered.

The mean influenza vaccine coverage of healthcare workers (HCW) was 40%. 836 patients were included (98% with a type A influenza virus in 2016-2017; 77% with a type B virus in 2017-2018). Most patients (81%) had an unknown vaccine status. Overall, the incidence of nosocomial influenza was 0.3/100 admissions (0.35/1000 patient-days). The most frequent comorbidities were diabetes (21%), chronic respiratory diseases (18%), and malnutrition (17%). Fever (77%) and cough (66%) were the most frequent symptoms. 70% of patients received anti-neuraminidases, 28% received antibiotics. Infectious complications such as pneumonia were reported in 8%. Overall, the all-cause mortality was 6%.

The occurrence of nosocomial influenza underlines the importance of vaccinating patients and HCW, rapidly recognising community or hospital-acquired cases, and applying adequate additional measures to prevent dissemination, including the timely administration of anti-neuraminidases to avoid antibiotic use (and misuse).

## **140: Standardisation of practice through technology: the single patient infection prevention record for Wales**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Infection Prevention Teams (IPT) in Wales previously used a variety of different electronic, paper and telephone systems to identify patients with potential healthcare associated infections; to record actions taken; treatment and advice given, and to collect additional data for monitoring trends. This made information difficult to access and standardise, both locally and for national surveillance.

Using Welsh Government start-up funding, a commercial infection prevention case management system was purchased for all IPT, to improve patient care, aid efficiency, standardise practice and simplify access to data. The system has been installed as a single national system, with links to all laboratory, patient administration and theatre systems in use in Wales. IPT have access to all data on patients in their hospital, including information from previous admissions to other Welsh hospitals.

A user forum has been established to support standardisation through use of the case management system. The forum has agreed alert organisms for monitoring by all, minimum data sets for specified organisms, and admission alerts that highlight high-risk admissions (eg patients with a history of multi-drug resistant organisms) which function within and between hospitals. These are under regular review and can be altered to reflect changes in priorities.

We have demonstrated that establishment of a national system for IPT is possible. Differences in IPT requirements have been identified and some issues are still to be resolved, but use of the system and consensus working through the user forum is bringing standardisation to IPT practice across Wales.

## 147: An investigation of the prevalence and temporal dynamics of *Staphylococcus aureus* carriage among healthcare workers

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Although healthcare workers (HCWs) have been implicated in the nosocomial transmission of *Staphylococcus aureus*, data on HCW colonisation in non-outbreak settings is limited.

**Objective:** This study aimed to investigate the prevalence and temporal dynamics of *S. aureus* carriage among HCWs in an Irish tertiary referral hospital.

**Methods:** Nasal swabs and oral rinses were obtained from HCW volunteers from nine hospital wards during two study phases: May-October 2017 (phase 1) and November 2017-May 2018 (phase 2). Samples were cultured on SaSelect and MRSASelect and confirmed as methicillin-resistant *S. aureus* (MRSA) and methicillin-susceptible *S. aureus* (MSSA) using routine identification methods. Isolates underwent Illumina whole-genome sequencing and whole-genome multilocus-sequence typing (wgMLST; BioNumerics, Applied Maths).

**Results:** A total of 229 HCWs were screened. MSSA and MRSA were recovered from 34% (79/229) and 3% (7/229) of HCWs, respectively. Sixty-four HCWs were sampled during both phases (range 55-265 days, mean difference 158 days); 51.5% (33/64) were positive for *S. aureus* during at least one phase and 26.5% (17/64) during both phases (16/17 MSSA and 1/17 MRSA). Using wgMLST, approximately half of HCWs that were *S. aureus* positive during both phases, were deemed to have harboured the same strain during both phases.

**Conclusion;** MSSA prevalence was high among HCWs and repeat screening combined with wgMLST revealed a high rate of persistent *S. aureus* carriage. Further WGS, involving HCW isolates from a third phase and patient isolates from all three phases, is ongoing to ultimately determine the role of HCWs in the nosocomial transmission of *S. aureus*.

## 156: Epidemiology of hospital acquired bloodstream infection (BSI) caused by *Acinetobacter baumannii*: ten years of experience in a teaching hospital of Northern Italy

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background.** *Acinetobacter baumannii* is a major cause of healthcare-associated infections and nosocomial outbreaks.

**Aims.** To calculate the incidence of BSI sustained by *Acinetobacter baumannii* and to evaluate the prevalence of *Acinetobacter baumannii* multidrug resistant (MDRAB) strains.

**Methods.** We conducted a retrospective observational study at the 1200 acute-care beds, San Martino Policlinic Hospital, located in Genoa, Liguria region, North-West Italy. We analyzed data of all patients with an hospital acquired BSI caused by *Acinetobacter baumannii* from January 2008 to December 2017.

**Results.** A total of 99 hospital acquired BSIs were found, 73 caused by MDRAB and 26 by non MDR *Acinetobacter baumannii* (nMDRAB). Median age, duration of hospitalization and in-hospital mortality were respectively 66 years (IQR = 55-78), 51 days (IQR = 33-84) and 63% for the MDRAB group and 60 years (IQR = 39-71), 36 days (IQR = 23-78) and 23.1% for the nMDRAB group. 46.6% of MDRAB BSIs were diagnosed in an intensive care unit, 28.8% in a medical ward, 10.9% in a rehabilitation ward and 8.2% in a hematologic-oncological ward. The overall incidence of BSI caused by MDRAB for 10,000 patient-days, stratified by year, was 0.02 in 2008, 0.04 in 2009, 0.38 in 2010, 0.49 in 2011, 0.29 in 2012, 0.02 in 2013, 0.09 in 2014, 0.14 in 2015, 0.09 in 2016 and finally 0.00 in 2017.

**Conclusions.** In recent years there has been a downward trend in the incidence of BSI caused by *Acinetobacter baumannii*, largely due to the decreased circulation of MDR strains.

## 159: Ten years of surveillance and control of *Klebsiella pneumoniae* hospital-acquired bloodstream infections: the experience from San Martino Policlinic Teaching Hospital in Genoa, North-West Italy

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background.** Effective strategies are needed to reduce the burden of multidrug resistant *Klebsiella pneumoniae*, particularly in intensive care units (ICUs).

**Aims.** To assess *Klebsiella pneumoniae* antimicrobial resistance over time and impact of different infection control interventions.

**Methods.** We conducted a retrospective observational study at the 1200 acute-care beds San Martino Policlinic Hospital, located in Genoa, North-West Italy. We analyzed data of all patients with an hospital acquired bloodstream infection (HA-BSI) caused by *Klebsiella pneumoniae* from January 2008 to December 2017.

**Results.** During the study period 909 HA-BSIs were reported, 576 caused by carbapenem resistant *Klebsiella pneumoniae* (CR-Kp) and 333 by non-carbapenem resistant *Klebsiella pneumoniae* (nCR-Kp). Trends of CR-Kp and nCR-Kp incidence rates were different: while CR-Kp HA-BSIs increased from 0.00 cases per 10,000 patients-days in 2008 to 2.12 in 2015 and then decreased up to 0.89 in 2017, nCR-Kp incidence remained stable from 0.62 in 2008 to 0.78 in 2014, with a little increase in the last 3 years (1.17 in 2017). Incidence trends were also different considering total hospital and ICUs: the incidence peak of HA-BSIs caused by CR-Kp in the entire hospital was registered in 2015, while for ICUs the highest value was observed in 2010 (25.47/10,000 patients-days), with a marked decrease in the last years (7.53 in 2017).

**Conclusion.** Intensified infection control measures, in particular routine rectal surveillance cultures (from 2012), mandatory CR-Kp HA-BSIs notification (from 2013) and a program of antimicrobial stewardship (from 2014), resulted effective in reducing the circulation of CR-Kp, especially in ICUs.

## **163: Improving patient management with *Staphylococcus aureus* bacteraemia. The evolution of a MSSA review group, enhanced surveillance and thematic review of cases 2016/18**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

*Staphylococcus aureus* bacteraemia is a serious infection associated with significant mortality and morbidity.

This work concentrates on both Trust and non-Trust apportioned meticillin sensitive *Staphylococcus aureus* (MSSA) bacteraemia cases in a large Teaching hospital.

The Trust MSSA review group has evolved since the introduction of mandatory reporting in 2011. All MSSA bacteraemia cases are reviewed, a root cause analysis implemented where applicable and there is active follow up on the treatment and management of cases. Identification of learning for the organisation has been key, and improvements in enhanced surveillance of cases has been ongoing.

The 2016/17 109 cases (31 Trust, 78 non-Trust) identified a number of areas for improvement in ongoing management, including antibiotic treatment, repeat blood cultures, and investigation for deep source, particularly echocardiography.

We introduced a *S.aureus* bacteraemia care bundle based on national guidelines for investigation and treatment as an improvement measure in November 2017. The clinician is guided through the care bundle when a positive blood culture is reported.

2017/18 – 112 cases (25 Trust, 87 non-Trust) the data showed significant improvement particularly in echocardiography (20% to 63%)- significant as 15% of cases were treated for infective endocarditis. Enhanced data collection identified sub therapeutic antibiotic therapy due to patient compliance issues in 8 cases – 6 of these were IVDU's. IVDU was a risk factor in 22/112 cases (20%).

Probable sources and quality indicators of management including improvements seen will be presented from 2016/18, covering 221 cases.

Actions taken and recommendations for further work will be discussed.

## 169: Secular trends (1990-2017) of methicillin resistant *Staphylococcus aureus* (MRSA) colonization and infection identified in a teaching hospital

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** Since the introduction of MRSA in our teaching hospital in 1990, a prevention program including active surveillance, contact precautions and decolonization of carriers has been carried out.

**Aim:** To determine secular trends of MRSA over a 27-year period.

**Material/Methods:** From 1990 to 2017, all cases of MRSA colonization and infection occurring among hospitalized patients were prospectively followed up. Cases were classified as nosocomial, non-nosocomial healthcare-related, community-acquired, or readmission of previously known carriers. The type of microbiological sample (screening vs. clinical sample) was also recorded. Secular trends were determined by linear regression analysis.

**Results:** 9213 MRSA cases in 6705 patients were identified. Mean age 67y (SD±17), 63% males. Overall, 38.8% were nosocomial-acquired, 30.1% health-care related, 29.2% readmissions, and 1.8% community-acquired. Overall, 53.5% of cases were detected by active surveillance and 46.5% by clinical samples (727 episodes of bacteraemia). Incidence increased significantly from 98 cases (0.32 cases/1000 patient-days) in 1990 to 557 cases (2.48/1000 patient-days) in 2017 along with a significant increase of cases identified through active surveillance (0.03 cases vs. 0.14 /1.000 patient-days). Nosocomial-acquired cases detected by clinical samples increased from 1990 to 2006 (0.29 cases vs. 0.49 cases/1000 patient-days), whereas a significant decrease was observed from 2007 to 2017 (0.49 vs. 0.22 cases/1000 patient-days). Community-acquired cases were first documented in 2001 and remained infrequent throughout the study period (0.00 vs. 0.007 cases/1000 patient-days).

**Conclusions:** Although MRSA cases increased along the study period, a significant reduction of nosocomial-acquired cases detected by clinical samples occurred during the last decade.

## 172: A prospective surveillance study of airborne *Aspergillus fumigatus* on an Irish University Hospital Campus

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

*Aspergillus fumigatus* is a known opportunistic pathogen, causing a variety of diseases. *A. fumigatus* spores are widely dispersed in the air, however excavation of soil during construction is thought to increase the burden. Air sampling is often performed for hospital surveillance, particularly during construction. Here we present fungal air sampling data from an Irish hospital in the course of a major new hospital building programme.

Air sampling was performed twice-monthly over two years at 13 hospital locations: 7 indoors and 6 outdoors. Indoor locations included a general and cardiothoracic intensive care unit (ICU), a haematology stem cell transplant unit and a haem-oncology ward each with different air ventilation arrangements. A dual head SAS air sampler was used to sample 1000L of air per location. Sabouraud dextrose agar was used to select *Aspergillus* colonies, and RPMI agar containing 2 mg/L voriconazole was used to screen for triazole resistant *Aspergillus* spp. Weather conditions were recorded for each sampling date. Spearman's rank correlation was used to analyse correlation between *Aspergillus* CFU counts and each weather condition.

During the 2 year period, only one triazole-resistant *A. fumigatus* was identified, from an outdoor location, and was confirmed as having the TR46/Y121F/T289A mutation. Air samples of both ICUs for the most part gave zero CFU. Other wards had varied CFU numbers. CFU counts differed between indoor and outdoor locations. The only weather parameter that significantly correlated with *Aspergillus* counts was humidity. Our results suggest that existing engineering and control measures are effectively controlling *Aspergillus* spore burden.

## 183: Predictors of adverse outcomes of ICU-acquired sepsis in the Italian SPIN-UTI network

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Healthcare-associated infections (HAIs) can trigger sepsis particularly in patients who are already at high risk, such as those admitted in Intensive Care Units (ICUs). The present study was conducted using data collected during a ten-years period in the framework of the Italian Nosocomial Infections Surveillance in ICUs - SPIN-UTI network, in order to report the frequency of ICU-acquired sepsis and to identify predictor factors associated with adverse outcomes.

The SPIN-UTI network adopted the European protocols for patient-based surveillance (HELICS and HAI-Net ICU protocols). For sepsis the definition of the ACCP/SCCM Consensus Conference Committee (1992) was adopted.

From 2008 to 2017, 13,512 patients were enrolled and among HAIs episodes, 47.0% led to sepsis. In sepsis episodes, *Acinetobacter baumannii*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* were the most frequently isolated microorganisms. Mortality (RR: 1.466; CI95%: 1.304-1.649) and mean length of ICU-stay (31.2 versus 24.3 days) were significantly higher in patients with ICU-acquired sepsis than in patients without sepsis. Regression analyses demonstrated that SAPS II score above the median value, antibiotic treatment in 48 hours before or after ICU admission, surgical intervention and *A. baumannii* and/or *K. pneumoniae* HAIs were significantly associated to sepsis risk. Furthermore, SAPS II score and older age were independent predictors of mortality in patients with sepsis. Our study demonstrates that ICU-acquired sepsis greatly increases mortality and length of ICU-stay in ICU patients. The identification of the predictors of sepsis occurrence and mortality is essential to design interventions for the prevention of infection, sepsis and of adverse clinical outcomes.

## **185: The epidemiology of *Escherichia coli* blood stream infections and predictors of mortality: a retrospective study**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction

*Escherichia coli* are the most common cause of blood stream infections (BSI) in overall population studies and are associated with significant mortality and morbidity. The aim of this study was to examine the predictive factors for mortality in patients with *E. coli* BSI.

### Methods

A single centre retrospective cohort study of *E. coli* blood stream infections was carried out over a one year period in 2017. The study included all blood samples for culture obtained from patients who presented to the hospital during the period 1st January 2017 to 31st December 2017. Demographic details and laboratory results were obtained including the variables, age, gender, source of acquisition, source of infection, white cell count, C-reactive protein and lactate. The primary outcome measure was 30 day crude mortality. Recurrence rate was also recorded. Univariate and multivariate regression were carried out to assess for explanatory variables associated with the mortality.

### Results

There was a total of 162 episodes of *E. coli* BSIs eligible for inclusion in this study. 54% were female and the median age was 73 (minimum 21, maximum 94). Fifty-one percent of the infections were a urinary source and 46% were community acquired. The 30 day crude mortality was 10% with a recurrence rate of 7%. Elevated lactate level was significantly associated with mortality based on univariate and multivariate regression analysis.

### Conclusion

*E. coli* BSIs have a 10% mortality and 7% recurrence rate in this cohort. There appears to be a significant association between elevated lactate and mortality.

## 190: Gram-negative blood stream Infections (GNBSI): the first year of enhanced mandatory surveillance at a London teaching hospital

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Introduction:

In 2016, the UK government announced an ambition to reduce healthcare-associated (HCA) GNBSI by 50% by 2021. NHS-Improvement mandated the reporting from April 2017 of *Klebsiella* species, and *Pseudomonas aeruginosa* BSI cases (in addition to *E. coli*) to Public Health England (PHE). We reviewed the first year of cases from a London teaching hospital.

### Methods:

Individual patient hospital and summary care records were reviewed. BSIs were categorised as community-onset (CO), HCA, or hospital onset (HO), as per published guidance.

### Results:

From April 2017 to March 2018, 318 BSIs were detected, 219(69%) *E. coli*, 62(19%) *Klebsiella* and 37(12%) *P. aeruginosa*. 79 cases(25%) were CO-non-HCA and 239(75%) HCA: 94(30% of total) HO, and 145(46% of total) CO-HCA, of which 51(16% of total) and 94 (30% of total) were associated with prior community and hospital care, respectively.

The most common HCA risk factors were: prior antimicrobial therapy 118(37%), urinary catheter 84(26%), vascular device 53(17%), and prior surgery 47(15%).

Potentially preventability was assessable in 310 cases (97%), of which 97(31%) were thought to be potentially preventable: 43(48%) HO, and 54(38%) CO-HCA of which 24/50(48%) and 30/90(33%) of cases associated with prior community and hospital care, respectively were thought to be potentially preventable.

### Discussion:

We found the highest rates of potentially preventable cases in HO, and CO-HCA cases associated with prior community care. Further analysis of preventable factors related to infection control, antimicrobial stewardship and patient pathways across the health economy will enable the development of interventions to reduce the burden of infections.

## **210: Application of WHONET for antimicrobial resistance surveillance of pathogens causing blood stream infections (BSI): User experience from India.**

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<sup>1</sup>Vmmc And Safdarjung Hospital

Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

WHONET is used for analysis of microbiology and antimicrobial susceptibility test (AST) results. Blood stream infections ( BSI) are common and laboratory based surveillance is crucial to understand the etiology and the burden of resistance and effectiveness of interventions.

Methods: The Department of Microbiology Safdarjung Hospital, a tertiary care hospital receives more than 1800 blood cultures per month. Cultures received from Jan – Dec 2017 was processed and isolates identified. AST was performed by disc diffusion method. The WHONET programme was customized for use. Data entry was done prospectively and WHONET was used for analysis ( daily, monthly and quarterly) for the the pathogen and AST by age, sex, specialty (paediatrics, Burns, surgery etc) and units within a specialty.

Results: The pathogen profile varied with specialty- *Pseudomonas*, *Acinetobacter* and *Staphylococcus aureus* being the predominant pathogen in Burns and plastic surgery , ICU and Paediatric departments respectively. The pathogens for Early and Late onset sepsis among neonates did not show distinct difference. The susceptibility pattern of various pathogens varied greatly according to specialty and among different units . Local problems in laboratory testing including quality of test were also highlighted by WHONET.

Conclusion: WHONET delineates local spread of drug-resistant strains and can explain uncommon prevalence of certain types of drug resistance at certain sites. It allows clinicians to distinguish their problems from other units and focus on infection control or antimicrobial use that might be related to those problems. The software also improves the quality of the AST.

## 211: Review of blood culture isolates from Haemato-Oncology wards at the Beatson West of Scotland Oncology Centre 2012-2017

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<sup>1</sup>Greater Glasgow & Clyde

Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background

Neutropenic sepsis can cause significant morbidity and mortality in Haemato-oncology patients and should therefore be treated promptly and effectively.

Our local Greater Glasgow & Clyde Therapeutics Handbook 2014 advises Piperacillin/Tazobactam and if SIRS>2 or NEWS >5 add Gentamicin IV, for first line empirical treatment of neutropenic sepsis. If there is suspected Staphylococcal infection then it is recommended that Vancomycin IV is also added.

A review was undertaken of all positive blood culture isolates received from the Beatson Oncology Centre over a 6 year period. Antimicrobial susceptibility data was extracted to ensure current empirical guidance was appropriate.

### Methods

All positive blood isolates identified from the Beatson Oncology Wards between 2012-2017 were analysed for the following:

- Proportion of positive blood cultures per ward per annum
- Proportion of Gram-negative and gram positive isolates per ward per annum
- Antimicrobial susceptibility data for gram positive and Gram-negative isolates
- Review of MSSA, MRSA, VRE isolates
- Review of *C.difficile* cases
- Review of candidaemias

### Conclusions

- The current GGC guideline for treatment of neutropenic sepsis in Haemato-oncology patients remains appropriate based on this review of blood culture isolates.
- Roughly 10% of all CONS isolates are resistant to Teicoplanin. This needs to be considered when empirically starting Teicoplanin for possible line sepsis.
- The very low incidence of candidaemias suggests that anti-fungal treatment is still not required as part of the empirical treatment of neutropenic sepsis.
- The rates of *C. difficile* on the wards were not of concern.

## **222: Puerperal sepsis is a significant contributor to maternal mortality in a resource limited setting: Evidence from MPDSR Survey in Ondo State Nigeria**

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Introduction: Nigeria presently accounts for the highest global burden of maternal deaths though 2% of world population but accounts for about 14% of maternal deaths

Aim: This study was carried out to determine the contribution of Puerperal Sepsis to maternal deaths in Ondo State, Nigeria

Methods: This was a retrospective study conducted from June 2012 to May 2016 at Secondary Health Facilities covering the 18 Local Government Areas in Ondo State, Nigeria. Maternal deaths in all health facilities were reported through prescribed forms by HMIS and DSNO officers under the supervision of Medical Officers. The data was recorded and analysed using descriptive statistics.

Results: There were 318 maternal deaths. Puerperal Sepsis accounted for 49 of these deaths. Only excessive bleeding after delivery that is post-partum haemorrhage (PPH) had a higher percentage which is the commonest cause of maternal deaths with 38.9% of total. The age group between 25-30 years and un-booked cases accounted for majority of overall maternal deaths.

Conclusions: Puerperal sepsis is a cause of preventable maternal mortality and its high prevalence in this study is worrisome for a country that has one of the highest Maternal Mortality Rate(MMR) in the world. Great emphasis must be placed on optimal aseptic measures during and after labour to prevent most of the cases. Sensitization and enlightenment campaigns for the general public on birth preparedness and complication readiness for health workers with respect to health care infection must be emplaced while a full hygiene audit of the health facilities must be done.

## 283: Surveillance and risk factors of healthcare associated infections in an Egyptian tertiary hospital; Menoufia University Hospitals ICU : A two years single center study

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Poster Talk 5 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** The surveillance system for HAIs is a cornerstone in the infection prevention and control activities. **Objectives:** To analyze the epidemiological and microbiological patterns of HAIs and their relation to the length of hospital stay (LOS) and underlying patient clinical status in tertiary hospitals, ICU. **Material and Methods** During the period from November 2015 to December 2017, the surveillance of HAIs in Menoufia University Hospitals' ICUs was assessed. Specimens for microbiological study were collected from patients, healthcare providers and environmental surfaces **Results:** Thirteen ICUs in 4 university hospitals contributed to 93280 patient days and revealed 157/428 patients (36.7%) with HAIs. 33.1% were central line associated- bloodstream infections (CLABSI), 34.4% were ventilator associated pneumonia,(VAP) surgical site infections (SSIs) represented 19.1%, and 13% were urinary tract infections. CLABSI had the highest incidence of both the rate 31/53 (58.5%) and device-days (4.08/1,000 central line days). The most common pathogens were *Klebsiella* spp (18.5%) and *S. aureus* (18.5%) followed by *Acinetobacter* spp (7.4%). The total LOS in HAIs was 14.3±23.8; The most frequent underlying medical conditions in BSI and VAP were DM 12/52 (23.1%) &18/54(33.3%) and cirrhotic patients 9/52 (17.3%), 11/54(10.4%); respectively. *S. aureus* ranked the first amongst organisms isolated from healthcare workers and environmental surfaces (89.6% and 29.4%; respectively) **Conclusion:** In our hospitals, there is a high incidence HAIs with high rate of multidrug resistant microorganisms which makes the commitment to antimicrobial stewardship is mandatory. Efforts should be done to maintain a robust infection control awareness strategy and a sustainable surveillance system .

## 2: HIV associated toxoplasmosis encountered in neurosurgical practice in Sri Lanka

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: The spectrum of HIV and co-infections are still underestimated in Sri Lanka. The objective of this study is to describe a case series where HIV associated toxoplasmosis encountered in neurosurgical practice.

Materials and methods: 5 cases of central nervous system toxoplasmosis were encountered during a period of one year.

1. 42 year old female presenting with encephalitic picture found to have a mass in the right frontal lobe.
2. 22 year old male presenting with acute paraplegia found to have a intramedullary mass lesion suggestive of giotic lesion at T11.
3. 46 years old male patient presenting with chronic headache followed by acute deterioration of consciousness found to have multiple space occupying lesions suggestive of giotic lesions in the brain.
4. 34 year old male patient who has been treated for cerebral toxoplasmosis presenting with gradual deterioration of consciousness found to have hydrocephalus.
5. 58 year old male with gradual para-paresis found to have a cystic lesion suggestive of glioblastoma in the thalamic region.

Results: All 5 patients were diagnosed to have HIV. Three patients with mass lesions were diagnosed by frozen section biopsy and treated with Pyrimethamine / sulfadiazine. The patient with the cystic lesion had high levels of anti-toxoplasma antibodies and responded to chemotherapy. Patient with the hydrocephalus had no evidence of active infection and treated with ventriculo-peritoneal shunting.

Conclusion: All patients with central nervous system toxoplasmosis should be investigated for HIV. Mass lesions should undergo frozen section biopsy during neurosurgery to exclude toxoplasmosis mimicking neoplastic lesions.

## 233: Epidemiology and clinical course of Malaria at an East London hospital

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background: Malaria is non-endemic to the UK and seen predominantly in the returning traveller. In the last 18 years, malaria has affected between 1377 to 2047 people annually in the UK, primarily falciparum type. Between 2015 to 2017 there have been 6 deaths each year from malaria. The profile and characteristics of this illness are poorly described in the UK and, with increasing travel to malaria endemic areas, it is important to highlight this infection.

Aim: Describe the epidemiology and clinical course of malaria in a London hospital.

Methods: Notes and laboratory results for serologically confirmed malaria cases from 2015 to end of 2017 were retrieved, and information gathered regarding: demographics of the patient, type of malaria, parasitology (when falciparum), clinical course, and treatment. Descriptive analysis was used to describe the epidemiology.

Results: Clinical notes were retrieved for 97 cases, out of a total of 170 new incidences. The most common sub-population to be diagnosed with malaria were individuals of African/ Black British ethnicity (59%), 62% of which had travelled to Nigeria prior to infection. Few (15%) were compliant with prophylactic anti-malarial regimens. The most prevalent type of malaria was falciparum (90%) and 25% of these cases were classified as severe. Treatment of choice was intravenous artesunate in 42% of cases, and doxycycline with quinine in 26%.

Conclusion: There is a significant disease burden of falciparum malaria in East London. Increased compliance with anti-malarial prophylaxis and adherence to treatment guidelines may provide avenues for reducing population morbidity in the future.

## **285: Exploring the influence of daily climate variables on malaria transmission and abundance of *Anopheles arabiensis***

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

The recent resurgence of malaria incidence across epidemic regions in South Africa has been linked to climatic and environmental factors. An in-depth investigation of the impact of climate variability and mosquito abundance on malaria parasite incidence may therefore offer useful insight towards the control of this life-threatening disease. In this study we investigate the influence of climatic factors on malaria transmission over Nkomazi municipality. The variability and interconnectedness between the variables were analyzed using wavelet coherence analysis. Time-series analyses revealed that malaria cases significantly declined after the outbreak in early 2000, but with a slight increase from 2015. Furthermore, the wavelet coherence and time-lagged correlation analyses identified rainfall and abundance of *Anopheles arabiensis* as the major variables responsible for malaria transmission over the study region. The analysis further highlights a high malaria intensity with the variables from 1998 – 2002, 2004 – 2006, and 2010 – 2013 and a noticeable periodicity value of 256 - 512 days. Also, malaria transmission shows a time lag of between one month to three months with respect to mosquito abundance and the different climatic variables. The findings from this study offer a better understanding of the importance of climatic factors on the transmission of malaria. The study further highlights the significant roles of *An. arabiensis* on malaria occurrence over Nkomazi. Implementing the mosquito model to predict mosquito abundance could provide more insight on malaria elimination or control in Africa.

## 4: The Impact of Libyan armed conflict on Children with HIV/AIDS

**Daw M**<sup>1</sup>, Dau A<sup>2</sup>

<sup>1,2</sup>

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background Libya is a large country facing EU has been erupted by armed conflict in 2011, There is growing concern that the conflict breaks down the health care services and jeopardize the country's ability to cope with HIV/AIDS epidemic. This study aims to assess and quantify the effects that the conflict had on human resources and health care system that provide the backbone for prevention, treatment and care for children with HIV/AIDS.

Methods Data collection was carried using a questionnaire survey, records review and face to face interview targeted at key informants in 20 National Health Settings(NHS) caring for 973 children with HIV/AIDS in Central (4 NHS), North (6), West (3), East (4) and South (3) of Libya. The data was statistically analyzed and correlated with the different factors involved including medical care and antiretroviral supply.

Results A major reduction of health care staff in the centers studied( $P < 0.001$ ) with a collapse of the infrastructure of health care system particularly in west, middle and south regions. The antiretroviral and other essential supplies were distorted in the west and south regions, though it was reported to be better in West, North and Central region due to involvement of non-governmental organisation.

Conclusions There is essential need for mechanisms to provide time-sensitive information on the effect of conflict on incidence and care of children with HIV/AIDS infection-International and regional organizations should be involved in HIV/AIDS prevention and care efforts, which should be continued through the post-conflict timing and then expanded to comprehensive preventive care particularly antiretroviral treatment.

## 10: Outbreak of nosocomially acquired bronchopneumonia

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** In hospitalised patients who develop respiratory symptoms and fever, one should consider the nosocomial bronchopneumonia. The likelihood increases when upon investigation symptoms are found of respiratory insufficiency, purulent secretions, newly developed infiltrate on the chest X-Ray, and increasing leucocyte count. Bronchial tree colonization by pathogens coming from the patient's oropharynx. Secondary bronchial tree infection are the main pathogenic mechanisms of nosocomial bronchopneumonia acquired by intubated patients.

**Methods:** We retrospectively investigated patients with nosocomial bronchopneumonia treated in a General Hospital Uzice, between 1 January 2008 and 31 December 2017. We collected following data: sex, age, risk factors (mechanical ventilation, intrinsic respiratory, neurologic, or other disease states that result in respiratory tract obstruction), laboratory findings, chest X-Ray, microbiological analysis, antibiotic treatment, outcome.

**Results:** Out of 239 patients with intrahospital infections of the respiratory tract, 73 (30.5%) was bronchopneumonia (42 male, 31 female). 59 (80.8%) of them were intubated, 47 (64.4%) patients had asthma, chronic obstructive pulmonary disease or pulmonary embolism, 26 (35.6%) had diabetes mellitus, chronic liver diseases, malignancy, or cardiopathy.

The most commonly isolated bacteria was multiresistant *Acinetobacter* spp. 37 (51%). Methicillin-resistant *Staphylococcus aureus* was in 13 (17.8%), *Klebsiella pneumoniae* and *Enterobacter* in 12 (16.4%). Fatal cases were 10 (13.7%). Factors predictive of morbidity were age older 65 and mechanical ventilation.

Multivariate analysis retained each of them as an independent risk factor.

**Conclusions:** Nosocomial bronchopneumonia is an aggressive disease, most common in intubated patients older than 65. It is most commonly caused by multiresistant *Acinetobacter* spp.

## 13: The epidemiological and geographical characterization of hepatitis d virus infection in Libya

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

The Epidemiological and Geographical Characterization of Hepatitis D Virus Infection in Libya

Background; Hepatitis D Virus (HDV) infection is a major global health problem and clinical and virological characteristics of patient with such infection are poorly understood. In African countries such as Libya which considered to be endemic area for HBV such data are scarce and epidemiological studies on HDV are needed This study aims to evaluate the sero-epidemiological characterization of anti-Delta antibodies in chronic hepatitis B carriers in Libya.

Methods; Serum samples were collected from 731 HBsAg positive individuals of Libyan patients within five years period ( 2013-2017). Each sample was tested for the presence of anti-Delta antibodies using a commercial immunoassay and correlated with the demographic factors associated with the infection

Results; Anti-HD virus antibodies were detected in 11(1.5%), samples ,higher among males than females (1.3:0.9); mean age  $54.4 \pm 13.7$  years), with a significant increase of those over 40 years old (  $P < 0.001$ ). The distribution of HDV varies greatly with the country the highest prevalence was reported within the Eastern provinces ( 1.9 %) followed by Western Mountains and Sebha area ( 1.7%) and less within Central and Western Provinces( 0.9%).

Conclusions; Despite the low prevalence of HDV among the Libyan population, preventive strategies for HBV prevention, which also apply to HDV, still be encouraged by healthcare providers and policy makers.

## 19: Trends and clustering analysis of hepatitis B and hepatitis C viruses mortality in Libya; 1998-2017

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### **Daw M<sup>1</sup>**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Background; Hepatitis B and hepatitis C viruses (HB&HC viruses) remain the most frequent cause associated with liver related mortality particularly among African countries. This study aimed to determine the mortality rates from HB&HC Viruses in Libya and analyze their geographical distribution to advance and prioritize the health policies needed.

Methods; The Libyan National Registry of death was analyzed from 1998 to 2017 and the causes of deaths due to viral hepatitis have been classified according to the 10th revision of the International Classification of Diseases (ICD-10). The Crude mortality rates were calculated and age-standardized by the direct method using the WHO standard population.

Results; Seven thousands, nine hundred twenty deaths had viral hepatitis mentioned in their death certificate [57% male, aged over 50 years. HCV associated with 69% crude mortality, 3-times higher than those associated with hepatitis B. Annual HBV-related liver death numbers were relatively stable, while HCV-related liver death numbers increased considerably ( $P < 0.001$ ). Older age was the strongly associated with of liver-related mortality, followed by history of Drug-use particularly with HCV. East region has a higher rates of HCV related mortality followed by South region, though HBV a higher mortality was reported in West Mountain-region and Meddle-west of the country.

Conclusion; Despite the low mortality rates of Viral hepatitis in Libya, such rates are not homogeneous particularly of HCV which is still a triggering problem within certain regions of the country. This highlights the need that health care policies should be customized according to geographical location of viral hepatitis clusters.

## **23: Deposition Of virus nucleotide sequences data to databases and acquisition of accession numbers: Report of clinical isolates of rotavirus from Nigerian children**

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<sup>1</sup>*ADEKUNLE AJASIN UNIVERSITY*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

Final port of successful molecular characterization of virus isolates is the deposition of nucleotide sequences data of such viruses to appropriate DNA databases. In the Nigerian scientific ecosystem, nucleotide sequences data of many acclaimed genotyped rotavirus were not found in several DNA databases. Invalidated or mistyped genotypes mislead, and non amenable for phylo-analyses. This report is the stepwise submission process to appropriate databases of validated gene sequences data of rotavirus isolates from hospitalised Nigerian children.

Stool specimens obtained by convenience sampling from 175 children hospitalised of acute diarrhea from August 2012 to July 2014 in Ado Ekiti, Nigeria, were screened for rotavirus using Enzyme Immuno Assay (EIA). Viral genomic RNA was extracted from EIA positive samples, the VP7 and VP4 genes were amplified in a one-step reverse transcription PCR, and the genotypes were identified in semi-nested multiplex PCR. Representative amplicons from genotypes identified were purified and sequenced using the Sanger method. Sequences were edited and queried to GenBank by BLAST, to retrieve, and compare reference strains. Nucleotide sequence alignment and phylogenetic analysis by Neighbor- joining method at 1000 bootstrap replicates were conducted in MEGA6 software. Fourteen validated gene sequences data were submitted to GenBank/DDBJ/ENA databases.

G-genotypes G1, G2, G3, G9, G12, and P-genotypes P[4], P[6], and P[8] were identified in 16% (28/175) of positive samples. Isolates were phylogenetically related to Asia, Indian and African strains. Accession numbers were obtained.

This study contributed to rotavirus gene sequences data in the GenBank, thereby enriching knowledge on molecular epidemiology of rotavirus in Nigeria.

### **30: Recent further advances in diagnostic testing for viral infections**

**Moses W<sup>1</sup>**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Background:** viral infection diseases represent an important portion of global public health concerns with thousands of deaths annually from serious pandemic and highly contagious infection to common influenza episodes.

**Methods:** Clinical prognosis often relies on early detection of the infectious agent. Thus, effective identification of viral pathogens is needed to help prevent transmission, set up appropriate therapy, monitor response to treatment and lead to efficient disease management and control.

**Results:** The aim of this review is to outline some of the recent technological advances in viral identification, including polymerase chain reaction, mass spectrometry and next-generation sequencing, and how they are applied in the diagnosis and management of viral infection. These powerful tools combine rapidity and efficiency in detecting viral pathogens and have revolutionized the field of clinical diagnostics.

**Conclusion:** However, a number of drawbacks such as high cost have limited their use in many laboratories, particularly in resource-limited settings. On the contrary, the advent of microfluidic technology has attracted increasing interest from biomedical research groups, and could represent a challenging alternative to diagnose viral infections at lower cost.

## 75: Screening for viral meningitis in infants and children – is it useful in clinical practice?

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

**Introduction:** Viral meningitis is a common cause for hospital admissions amongst children in temperate climates, particularly during the summer months. Clinically, differentiating viral meningitis from bacterial meningitis can be difficult. With the exception of neonates and immunocompromised children, viral meningitis due to enterovirus tends to be benign. The purpose of this study was to examine the usefulness of viral PCR testing of CSF samples on clinical practice including outcome.

**Methods:** We reviewed viral CSF PCR results from neonates, infants and children admitted to Torbay Hospital between 2011 and 2017. Testing was undertaken by Bristol virology PHE laboratory using in house tests until April 2015 and thereafter by Torbay Hospital using the FTD viral meningitis panel.

**Results:** Of 196 CSF samples, 49 (25.1%) were positive with enterovirus with HSV 1 or 2, VZV and HHV-6 detected in 41(21%), 2(1%), 5 (2.5%) and 1(0.5%), respectively. These results were compared with adjusted WCC CSF and protein count, CRP and peripheral WCC as well as duration of antibiotics, nature of admission and length of stay.

**Conclusion:** In terms of clinical outcome, analysis showed that a positive PCR correlated with reduced admission to HDU ( $p < 0.05$ ), reduced length of antibiotics ( $p < 0.05$ ) as well as a shorter median length of stay. Adjusted CSF WCC of  $\geq 10/uL$  correlated with a positive PCR ( $p < 0.05$ ) but limiting PCR to the above cut off would have missed 38% of viral PCR positives. Following these findings, a new algorithm for the management of suspected viral meningitis has been introduced locally.

## **79: Effects of climatic factors on Dengue incidence in central India: Implications for interventions and control**

**Nigam R<sup>1</sup>**

<sup>1</sup>*Rajeev Gandhi College, Barkatullah University*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

### Background & objectives:

Dengue is caused an arbovirus which is transmitted by Aedes mosquito. The mosquito lifecycle is known to be influenced by various climatic factors . This study was carried out to examine whether the climatic factors data can be used to predict yearly dengue cases of Bhopal city, of central India.

### Methods:

Monthly reported dengue cases and climate data for the years 2012–2016 were obtained from the Chief Medical and Health officer, Bhopal and Meteorological Department , respectively. One-way analysis of variance was used to analyse, the climatic parameters among seasons. Four monthly models were developed using negative binomial generalized linear model analysis. Monthly rainfall, temperature, humidity, were used as independent variables, and the number of dengue cases reported monthly was used as the dependent variable.

### Results:

Climatic factors, like rainfall, maximum temperature and relative humidity were significantly correlated with monthly reported dengue cases. The greatest number of cases were reported during the post-monsoon period each year. Temperature, rainfall, and humidity varied significantly across the pre-monsoon, monsoon, and post-monsoon periods. The best correlation between these three climatic factors and dengue occurrence was at a time lag of 2 months.

### Conclusions:

Our results showed that the climate had a major effect on the occurrence of dengue infection in Bhopal city. Though the prediction model had some limitations in predicting the monthly number of dengue cases, it could forecast possible outbreak two months in advance with considerable accuracy, and can act as early warning system for intensifying dengue control measures.

## **230: An audit involving confirmed flu cases and incidence of Group A *Streptococcus* and *Streptococcus pneumoniae* isolates in concurrent microbiology specimens**

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Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

After observations made in the Microbiology department about the incidence of Group A *Streptococcus* and *Streptococcus pneumoniae* in patients post flu, particularly in our local Intensive care department, this audit was undertaken to assess whether this pattern was a true rise in incidence.

I used data from two consecutive flu seasons was analysed; 2016/2017 and 2017/2018 and in particular focussed on the months November, December and January; the peak flu season.

Results for flu season November 2016 – January 2017:

563 positive flu samples were reported from the West of Scotland Virology lab for Greater Glasgow and Clyde. Out of these samples, 481 were Influenza A positive and the remaining 88 were Influenza B positive. 8 patients were found to be both Influenza A and B positive.

Total number of Group A *Streptococcus* cases seen within this flu season was 1, and the total number of *Streptococcus pneumoniae* isolates seen was 3. In 2016/2017 this was confirmed in a throat swab and in 2017/2018 the confirmed cases were found in blood cultures, wound swabs and throat swabs.

Results for flu season November 2017 – January 2018:

1045 samples were reported positive for Influenza by the West of Scotland Virology lab for Greater Glasgow and Clyde between these dates. Of these 1,045 samples, 798 were positive for Influenza A and 247 were positive for Influenza B. 3 samples were Influenza A+ B positive.

Total number of Group A *Streptococcus* cases was 8 and total number of *Streptococcus pneumoniae* cases was 6.

## **265: Efficacy of low-dose valganciclovir for CMV prophylaxis post-orthotopic liver transplant (OLT)-a retrospective audit and review.**

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<sup>1</sup>*St Vincents Hospital Group*

Poster Talk 6 (Tue 27 Nov 17:00 - 18:00), Exhibition Hall

CMV prophylaxis with valganciclovir is routinely administered post-operatively to all at-risk OLT recipients (CMV D+R+, D+R-, D-R+) in the National Liver Unit in St Vincent's University Hospital, Ireland. A reduced dose of 450mg OD administered for 3 months post-transplant has been utilised since 2012 in place of the standard prophylactic dose of 900mg OD following publication of a meta-analysis advocating this practice. This regimen was adopted to minimise drug-related toxicity, drug-drug interactions, economic cost and to reduce the likelihood of tissue invasive CMV disease after discontinuation of prophylaxis.

A retrospective audit and review process was undertaken to assess compliance with local guidelines for CMV prophylaxis in OLT recipients and to identify patients with evidence of CMV infection in the first post-operative year. Data was collected from surveillance databases and clinical records on all patients transplanted between 1st March 2016 and March 2017, with a 12 month follow-up period.

Fifty-seven patients underwent OLT during the study period, of which 37 required CMV prophylaxis. Four patients were excluded from the analysis. Twenty-two patients received the correct regimen for prophylaxis (67%). Three patients were prescribed the wrong agent (valaciclovir), 4 were incorrectly dosed, 5 were commenced later than that recommended and 1 had prophylaxis discontinued one month too early. Four patients (11%) developed CMV viraemia, all of which had received correct prophylaxis (range 9-122 days post-OLT, 2 D+R- and 2 D-R+). All responded to treatment with valganciclovir. There were no cases of ganciclovir-resistant CMV identified. There was no allograft loss and no deaths.